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ABSTRACT

Before the break-up of the Soviet Union, Armenia had a highly developed and expensive education system, matching the needs of the command economy. The government is now facing an enormous challenge to sustain universal coverage and performance standards in primary-secondary education with a small fraction of the former budget, while reorienting the system to the needs of a democratic society and market economy. The system in Armenia still suffers from widespread inherited inefficiencies. This study sought to clarify the significance of these inefficiencies for the future costs and performance of the system, to highlight the trade-offs involved, and to identify further measures needed to overcome the constraints to rationalization. This paper examines recent evolution of the structure of inputs and expenditure to general education in Armenia in comparison with international norms and practice, and outlines various approaches that have been proposed for restructuring the system in the context of the government's sectoral reform strategy. The paper uses a simple model to project the future cost impact of different policy options in relation to fiscal projections for the next decade, and to highlight the potential tradeoffs in terms of national education objectives. Conclusions concern the depth of rationalization and the financing strategy that would be needed to sustain universal access and quality of the system over the medium term. Also, some of the practical and institutional obstacles to actually implementing rationalization are identified and solutions are proposed. The model can be adapted for ongoing use by policymakers in Armenia to test alternative scenarios under different assumptions, or for use in other countries. Contains 2 boxes, 29 figures, 6 tables, and 15 references. Appended are methodology, assumptions, and projections. (Author/BT)

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Armenia

Restructuring to Sustain Universal General Education

SO 032 795

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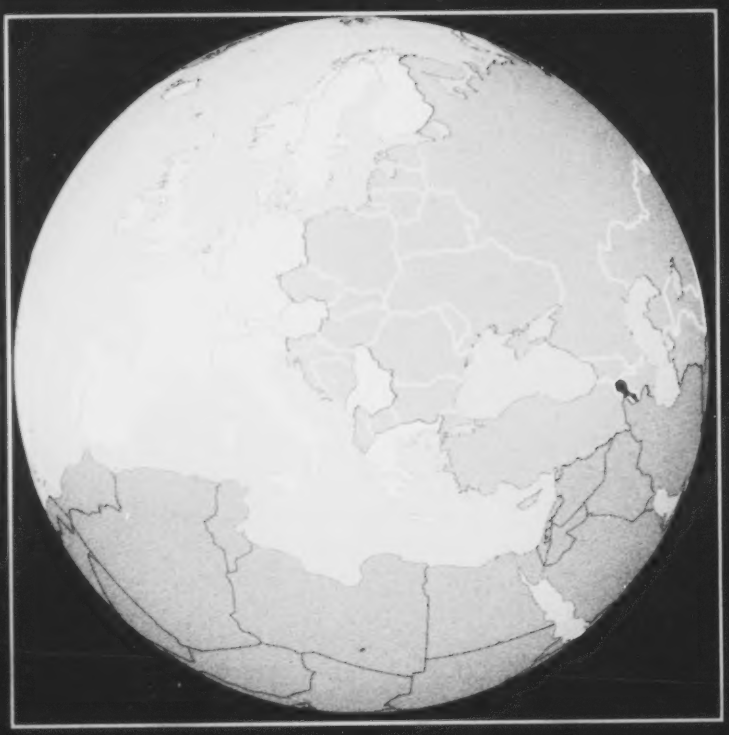

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Europe and Central Asia Poverty Reduction and Economic Management Series

Armenia

Restructuring to Sustain Universal General Education

Gillian Perkins
Ruslan Yemtsov

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ARMENIA

RESTRUCTURING TO SUSTAIN UNIVERSAL GENERAL EDUCATION

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FOREWORD

Work on this study has been closely coordinated with on-going policy development in Armenia and with technical work carried out by the Ministry of Education's Working Group for Finance and Management Reform (which includes representatives of the Ministry of Finance, regional education authorities, the Center for Education Projects and the Education Reform Center, as well as key staff of the Ministry of Education) and by the Ministry of Finance's program budgeting team. Both groups have confronted the particularly difficult issue of the need for rationalization to improve efficiency of general schools; however, this element of the government's reform program for the sector is naturally controversial and the strategy for implementation is still not fully convincing. This study was devised to help clarify some of the issues involved, highlight the future implications of alternative policy options, and identify further steps that can be taken.

The study was conducted and written by Gillian Perkins (ECSHD, former Task Team Leader for education in Armenia) and Ruslan Yemtsov (ECSPE) who designed and developed the computerized model for projecting costs under alternative scenarios. Ana Revenga (ECSPE) was instrumental in conceiving and initiating the study. Ruzanna Gevorgyan in the Armenia Country Office played an important role in data gathering and coordination in Armenia. Maureen Lewis and Tom Hoopengardner (ECSHD) provided valuable comments on early drafts. Dissemination and discussion of the draft report in Armenia was facilitated by Susanna Hayrepetyan in the Country Office. This final report benefits from the discussion in Armenia and the comments, in particular, of Aida Topuzyan (Deputy Minister for General Education), Karine Haroutyunyan (Director of the Center for Education Projects), Victor Matirossyan (Director of the Education Reform Center), and of Vahe Topalyan, Robert Stepanyan, Karen Melkomyan and Ara Avetisyan (Heads of Department in the Ministry of Education and Science). The Bank's Program Team Leader is Lev Frienkman (ECSPE); Sector Manager is Samuel Otoo; Country Director is Judy O'Connor.

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ABSTRACT

Before the breakup of the Soviet Union, Armenia had a highly developed and expensive education system, matching the needs of the command economy. As in many other CIS countries, the government is now facing an enormous challenge to sustain universal coverage and performance standards in primary-secondary education with a small fraction of the former budget, while reorienting the system to the needs of a democratic society and market economy. Although substantial progress has been made in Armenia, introducing major reforms of school finance and governance, the system still suffers from widespread inherited inefficiencies, including exceptionally high staffing ratios and underutilized buildings. The purposes of this study are to help clarify the significance of these inefficiencies for the future costs and performance of the system, to highlight the trade-offs involved, and to identify further measures that would be needed to overcome the constraints to rationalization.

The paper examines recent evolution of the structure of inputs and expenditure to general education in Armenia in comparison with international norms and practice, and outlines various approaches that have been proposed for restructuring the system in the context of the government's sectoral reform strategy. A simple model is used to project the future cost impact of different policy options in relation to fiscal projections for the next decade, and to highlight the potential trade-offs in terms of national education objectives. From these results, conclusions are drawn concerning the depth of rationalization and the financing strategy that would be needed to sustain universal access and quality of the system over the medium term. Finally, some of the practical and institutional obstacles to actually implementing rationalization are identified, and measures are proposed to help overcome these constraints. The discussion and conclusions relate specifically to Armenia; however, the approaches to addressing these questions are potentially relevant for other countries in the region confronting similar challenges. The model developed for this study can be easily adapted for on-going use by policymakers in Armenia to test alternative scenarios under different assumptions, or for use in other countries.

CURRENCY AND EQUIVALENT UNITS

Currency Unit = Dram

US$1.0 = 537.20 Drams

(As of October 24 2000)

ACRONYMS AND ABBREVIATIONS

ASIF	Armenia Social Investment Fund
CIS	Commonwealth of Independent States
GDP	Gross Domestic Product
MoES	Ministry of Education and Science
MoF	Ministry of Finance
MTEF	Medium Term Expenditure Framework
OECD	Organization for Economic Co-operation and Development
PPP	Purchasing Power Parity
USAID	United States Agency for International Development
VET	Vocational education and training

EXECUTIVE SUMMARY

Background and Purpose of the Study

In common with other countries of the CIS, Armenia faces the challenge of reforming its education system to match the needs of a market economy and democratic society. Reforms of curriculum, standards, teaching methodology and assessment are all in process. However, the ability to implement these reforms successfully, and to sustain universal access to general (primary-secondary) education, is seriously constrained by fiscal limits and by widespread inefficiencies inherited from the Soviet system.

For Armenia, these difficulties are particularly severe. Following the collapse of the Soviet Union, Armenia experienced one of the sharpest economic contractions in the region. GDP fell by an estimated 70%, while the share of GDP allocated to education has fallen from a high of almost 8% in 1989 to a current level of just over 2%. At the same time, the pupil/teacher ratio remains extremely low (at about 10) and excess school buildings capacity is estimated at about 20%. Since independence, public expenditure on general education has covered little beyond salaries, which have been far below subsistence level. In these circumstances, it is a remarkable testament to the value placed on education by the Armenian population that, for the most part, Armenian schools have continued to operate and high enrolment rates have been sustained. In so far as the crisis has been survived, however, this has been at the expense of depleting the sector's substantial assets and storing up problems for the future:

- Failure to fund maintenance of buildings and heating systems is generating massively higher costs for the future in major rehabilitation and reconstruction, as well as threatening the health and safety of school children and staff.

- The quality of the teaching force is liable to be progressively eroded by extremely poor salaries and teaching conditions.

- The effectiveness of teachers is constrained by lack of resources for in-service training, teaching materials or equipment.

- Capacity to implement important reforms—in standards, curricula, classroom processes, and assessment—is constrained by the same factors.

- Dependence of public schools on non-budgetary sources of funding to meet even basic essential costs is resulting in growing inequities within the system, with potentially serious long-term implications for poverty and social development.

- The impact of excess staffing and buildings capacity would be expected to increase over the medium term as wages rise relative to other prices, and as collection is enforced of energy tariffs at cost recovery levels.

If the constitutional commitment to maintaining universal general education in Armenia is to be fulfilled without major sacrifice of equity and quality objectives, ways must be found both to mobilize additional funds and to use resources—in particular staff and buildings—more efficiently. The Government of Armenia has taken important steps to address these issues, including (i) expansion and restructuring of the education budget under the government's new Medium Term Expenditure Framework and (ii) radical reform of school finance, management and governance, giving schools the incentives and means to use resources more efficiently, and providing formal and transparent channels for schools to mobilize non-budgetary finance. These reforms, allocating funding to schools on a per-pupil basis and giving schools autonomy in managing their own budgets, have been introduced in 154 (about 10% of) schools in a pilot phase and are scheduled to be extended nationwide in 2001-2002.

It is unlikely, however, that the measures taken so far will be sufficient. Some decisions still need to be taken above the level of the individual school. These include decisions on consolidation of underutilized schools and merging or restructuring of classes between schools. Although the Ministry of Education has developed new norms and standards for schools and guidelines for rationalization, and some work has been done to develop regional rationalization plans, commitment has been insufficient to overcome inevitable opposition and to make the plans fully implementable. The purposes of this paper are:

(i) to clarify the case for rationalization of schools by quantifying the future cost implications of alternative policies, and by highlighting the trade-offs involved;

(ii) to identify further measures needed in Armenia to promote restructuring and to secure adequate financing of the system over the medium term.

Projections

For this study, a model was developed to estimate the full costs of universal general schooling in Armenia to the year 2009 under alternative restructuring scenarios, and to test the viability of (i) the Ministry of Education's rationalization plan and (ii) the Ministry of Finance's Medium Term Expenditure Framework (MTEF) in meeting the future needs of the system.

In broad terms, the results confirm that:

- *The existing problems of the general education system cannot be solved simply through an increase in public expenditure.* Even under the most optimistic scenario for growth of the economy and tax revenue, budgetary resources would continue to be insufficient to fund the full costs of maintaining the primary-secondary education system in its existing form. Adequate funding of the system without any change in staffing ratios would cost four times the existing budget for the sector, and double the budget in 2009 (based on MTEF projections).

- *They also cannot be solved simply by cutting back staff.* Even with fairly generous public expenditure projections based on the MTEF, the average class size would need to reach almost 50, making 63% of the teaching force redundant, to allow an adequate rate of pay to

teachers and funding of essential non-wage inputs. This would be clearly unacceptable on educational, political and practical grounds.

- *Schools will continue to depend on non-budgetary sources of funding over the medium term.* Under any plausible scenarios of fiscal capacity and staffing rationalization, public expenditure on general education in Armenia will not be sufficient over the medium term to meet the full costs of quality, universal, general education.

The trade-off between teachers' wages and the pupil/teacher ratio

The study leaves no doubt that increases in the rate of compensation to teachers in Armenia are unaffordable without a major rationalization effort in the education system. When all school staff are included in the picture—non-teaching staff as well as teachers—the model indicates that, if all non-staff inputs to schools were adequately funded, and with no change in staffing ratios, the MTEF projected budget would allow an average wage to school staff of a mere 15% of per capita GDP in 2007.

What if nothing is done?

The baseline case takes actual per pupil ratios in 1998 as given and extends the costs into the future with a constant growth rate. All physical inputs are assumed to stay constant at the existing levels (number of pupils per teacher, number of classes per school, number of non-teaching staff, electricity consumption, all non-wage expenditures). The wage rate of teachers compared to the national average wage rate is projected to remain at the existing level of 53%.

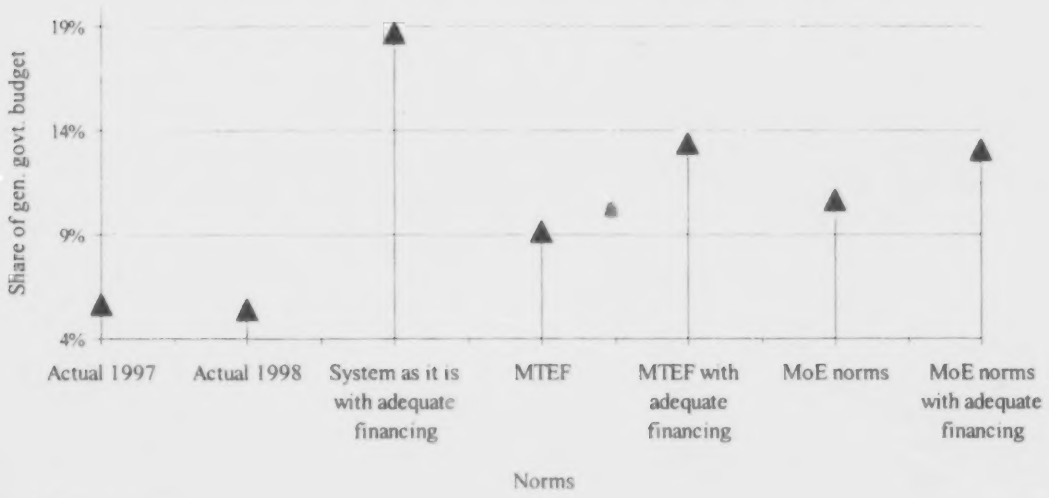
This scenario would require for general education only an estimated 5.5% of the total consolidated government budget by the year 2007, clearly a manageable target, up from 4.3% in 1998. This is an unacceptable scenario, however, in terms of education objectives and sustainability. With no improvement in wages of teachers relative to the national average wage, or in resources for in-service training, it would be difficult to sustain quality of the teaching force. Many schools would be forced to close for part of the winter because of lack of heating. Learning outcomes would also be affected by lack of teaching materials and essential equipment. Inequities between schools in the quality of education would escalate, because of different capacities of local communities to raise funds for essential non-salary inputs. Continuing to defer regular maintenance and repair of school buildings would generate mounting costs for the future in major reconstruction. Physical conditions in an increasing number of schools would be bad enough to impede learning. And the potential closure of some schools for health and safety reasons could jeopardize the principle of universal access.

The total theoretical "funding gap" for the baseline case—the difference between projected actual budgetary expenditure on general education and the estimated full annual costs of funding schools adequately with baseline staffing ratios—would amount to 2.8% of GDP in 2007. Some of this gap would be met by private finance, estimated above 1% of GDP, but the impact of private finance is likely to be less socially efficient and equitable.

The impact of restructuring

The potential impact of restructuring is illustrated in Figure 1. According to our analysis, the expenditure norms proposed by the Ministry of Education are fairly realistic in terms of the needs of the system, but they would far exceed even relatively optimistic fiscal projections (by about 60% in 2007). The Medium Term Expenditure Framework proposed by the Ministry of Finance is tailored to budget projections but falls short of meeting the needs of schools in some crucial respects, namely teachers' rate of pay, buildings maintenance and heating, teaching equipment and materials. However, the changes proposed in staffing ratios and class sizes in both the MoES and the MTEF scenarios are conservative by international standards, and would serve only to reduce staffing levels to those prevailing in the richest economies. It is highly likely, therefore, that Armenia could achieve better education outcomes within its resources by increasing the pupil/teacher ratio beyond the level envisaged in the MTEF (14) to at least 20—giving teachers larger classes but paying them more and supporting them with the necessary equipment, materials, facilities and services.

Figure 1: Share of the state budget required by general education to cover norms by 2007, baseline macro assumptions



Source: Authors computations.

Policy Implications

Sustaining universal general education in Armenia will require actions on three fronts: restructuring to allow more efficient deployment of teachers and buildings; higher priority to general education within the budget; and more effective mobilization of non-budgetary resources.

Restructuring to meet education objectives

The aim of improving efficiency is to make the most progress possible with available resources to meet national education objectives—to raise standards, maintain equity and

universal access, and support social and economic development. The program of school rationalization is justified in so far as it contributes to these objectives and is closely integrated within the overall education policy framework. This study concludes that major rationalization of school staffing and buildings, with a target of about 20 for the pupil/teacher ratio, is needed in Armenia to (i) maintain and improve teaching performance by allowing better financial and material support to teachers, (ii) protect universal access by ensuring financial sustainability of the system, and (iii) limit inequities between schools and individual pupils by making it possible to cover a larger share of basic public school operating costs from the public budget.

The pupil/teacher ratio is a function of average class size and the average number of teachers per class. Factors that are keeping down the average class size in Armenia, or keeping up the number of teachers per class, include: (i) disincentives and lack of flexibility at the school level to use staff more efficiently; (ii) the prevalence of very small schools (in small, remote communities, or due to demographic movements), combined with poor transport infrastructure; (iii) the expectation that every school should cover all 10 grades; (iv) the relatively high degree of specialization by teachers, related to an excessively fragmented curriculum; and (v) the relatively small number of specified "full time" teaching hours per week. A range of measures can help improve efficiency of the teaching force and support qualitative objectives without jeopardizing the principle of universal access:

- *Give schools more autonomy.* The new school finance and governance arrangements now being implemented, including capitation funding and school-based budget management, can be expected to overcoming existing obstacles to improving efficiency at the school level. With appropriate support from the center, they can also be expected to encourage initiative and innovation to improve learning outcomes.

- *Use multi-grade classes.* For very small schools that cannot be consolidated because of transport or strategic constraints, primary classes can be consolidated in multi-grade classes. With appropriate training and materials for teachers, this approach can have learning benefits as well as improving efficiency.

- *Use multi-subject teachers.* Training teachers in more than one subject can help to reduce the number of teachers per class. Combined with the current proposals of the Ministry to improve subject integration in the new curriculum, this measure could also have pedagogical benefits.

- *Merge schools.* Restructuring schools, e.g., consolidating underutilized schools, or merging secondary or upper secondary classes in separate schools, can also facilitate larger classes and more efficient deployment of teachers, and may improve learning outcomes by giving upper secondary pupils access to a larger number of qualified teachers.

- *Limit secondary level options.* Economies of scale are greatest when the range of options available to high school pupils – both in curriculum/specialization and in type of school – is limited. Postponing vocational/professional specialization also has the benefit of giving all pupils a strong enough basis for further learning and adaptability to changes in labor market demand.

- *Increase teacher hours.* Increasing the number of teaching hours per week required for a "full time" teacher can be linked explicitly to salary increases (as can increases in class size).

These measures should all be closely considered in the course of designing the proposed new 11-year curriculum and related training. At the same time, details of all relevant central policies need to be made clear to local authorities and schools, so that rationalization plans made at these levels match nationally-set requirements and incorporate the full range of options.

Improving public expenditure

The government's new Medium Term Expenditure Framework for 2000-2002 (MTEF) is well designed to support the reform strategy for general education. According to our analysis, the projected level of expenditure can come close to addressing the needs of the system *if*

- the projected increases in pupil/teacher ratio and in teachers' salaries continue at the same rate until 2008.

- the short term costs of rationalization are accounted for.

- private expenditure amounting to at least 0.5% of GDP can be mobilized effectively for the basic costs of public schools.

- other sources of funding, including privatization proceeds, are tapped for major school repair and reconstruction.

The MTEF schedules extension of the new capitation funding mechanism to all schools in the country (with the exception of small schools in the remote and strategically important villages) by 2002. Successful implementation of this major reform will need a more concerted focus by both Ministries of Finance and Education on:

- capacity building needs at the school level;
- transparency and reliability in disbursements to schools;
- maintaining adequate efficiency incentives in the funding mechanism;
- on-going assessment and monitoring functions.

Limiting inequities

Continuing dependence of public schools on non-budgetary finance over the medium term presents a major challenge and will call for:

- Further measures to formalize and improve the social efficiency of private spending on general education (Armenia's new textbook system, depending on school-level control and management of revolving funds, provides one model).

- Close monitoring of the incidence of private expenditure and of differences (between schools, regions and socio-economic groups) in access, enrolment rates, attendance rates, drop-out rates, assessment results, selection for higher education, etc.

- Design and testing of measures to moderate emerging inequities, including mechanisms to target supplementary funding to schools in the neediest communities, and to target subsidies (for pre-school, textbooks, extra-curricular services, post-secondary education) on the basis of need.

- Improving the linkage between the public secondary school curriculum and selection for higher education.

Implementing rationalization

Several factors have operated against actual implementation of rationalization plans developed so far: (i) lack of continuity in commitment to the reform due to high turnover of Ministers of Education and other key officials; (ii) general under-estimation of the detailed requirements for local consultation, technical analysis, scheduling and implementation; and (iii) financial disincentives of the budget system, basing most of the funding to schools on the number of classes. The latter constraint is now being resolved through the introduction of funding based primarily on the number of pupils. Further measures are needed to address the other factors:

- Strengthening change leadership, management and continuity, e.g., building a core team of change agents in the Ministry of Education and key regional positions, and possibly setting up an independent/advisory council to help forge ties between reformers and societal groups.

- Strengthening public information activities and debate of the issues related to school rationalization.

- Further clarification of roles and responsibilities (including the role of hamainks) in planning and implementing school rationalization.

- More emphasis on ensuring adequate compensation and incentives, including (i) clarification of redundancy policy and (ii) linkage of funding for rehabilitation of school buildings with the rationalization process.

- More attention to preparing and disseminating clear guidelines for the local planning process, including (i) information on relevant central policies, (ii) requirements for local information and public consultation processes, and (iii) guidelines for systematic technical analysis of restructuring options, costs and benefits.

- Systematic estimation of the short-term costs of rationalization. Matching of implementation schedules with budgetary capacity to meet these costs.

1. BACKGROUND AND PURPOSE OF THE STUDY

Countries of the CIS are in the process of reforming primary-secondary ("general") education systems to match the needs of their transition economies and newly democratic societies. They have all made progress in varying degrees in curriculum reform. Most have carried out some form of decentralization of finance and/or management, with mixed results. An important area where very little headway has been made is in reducing excess staff and school buildings. Despite substantial falls in public funding to education throughout the region following the break-up of the Soviet Union, pupil/teacher ratios and class sizes continue to be small even in comparison with those in the world's wealthiest economies. Because of recent demographic trends, this over-capacity is even tending to grow in some countries in the region. The overall consequences are that levels of teacher compensation are too low to promote quality and morale of the teaching force, the physical condition of buildings cannot be adequately maintained, and the effectiveness of teachers is diminished by lack of funds for other essential inputs—including equipment, supplies, library and teaching materials, and in-service training—which are particularly important for successful implementation of the new curricula and reforms in classroom practices.

The Government of Armenia has been working on this problem for the last four years and has introduced some important reforms to improve efficiency in the sector. It is unlikely, however, that the measures taken so far will be sufficient. The purposes of this paper are (i) to clarify the case for rationalization by quantifying the future cost implications and affordability of various policy options, and (ii) to identify further measures needed in Armenia to promote restructuring and to secure adequate financing of the system over the medium term.

Nature of the Challenge

The particular challenges facing the CIS countries in the education sector are historically unique and, in some respects, almost the reverse of those typically facing low and middle income countries. With educated populations, basic literacy and enrolment rates at or near OECD levels, and per capita GDP at low- or middle-income levels, the countries of the former Soviet Union are now having to sustain their education systems with a fraction of the resources that were spent on education during the Soviet era. Unlike low- or middle-income countries in other parts of the world, their concern is not to expand capacity and increase enrolment rates, but to reduce excess capacity, overcome entrenched inefficiencies of the inherited system which include massive overstaffing, and to maintain equity, standards, and universal access to general education despite drastic falls in public revenues.

For Armenia, these difficulties are particularly severe. Following the collapse of the Soviet Union, Armenia experienced one of the sharpest economic contractions in the region. GDP fell by an estimated 70%, while the share of GDP allocated to education has fallen from a high of almost 8% in 1989 to a current level of just over 2%. Per capita public expenditure on education has declined from an estimated US$292 equivalent in 1989 to about US$33 equivalent (assuming 1.66 PPP/exchange rate ratio). No country elsewhere in the world with an income level close to the current level in Armenia (per capita GDP estimated at <US$500), and with tax revenues at

such a low rate (15% of GDP), has been able to finance free and universal/compulsory general education.

At the same time, education is valued especially highly by the Armenian population and expectations remain high concerning the obligation of the state to provide extensive, high quality education services free of charge to the student. It is well understood that the country's future development depends fundamentally on how its education system performs now and over the medium term—for the human capital on which growth of the economy will depend, the future extent of poverty and social inequality, the strength of social cohesion, and the development of civic and democratic institutions. The state of primary-secondary education will have particularly significant long term social and economic consequences. Under the Soviet system, all school leavers were guaranteed employment, regardless of what they had or had not gained from their schooling. However, if today's school age children leave school without the level of knowledge and skills needed for continuing learning (on-the-job, and/or through formal/non formal public/private programs) they are liable to be unemployable in the new economy.

It is because of the long term implications for society as a whole that the state needs to take particular responsibility for the quality and universal coverage of general education. The full social and economic impact of deficiencies in primary-secondary education will not be felt for some time to come. It will fall on the next generation, by which time the negative consequences —including the possibility of entrenched inter-generational poverty—could be very difficult to reverse. Increasing inequalities of income related to education achievement are to be expected in the transition to a market economy, as the economy grows and labor markets become more developed. A key challenge for public policy is to minimize the numbers of people effectively *excluded* from the new labor markets because of inadequate basic education. If the system of basic schooling fails to meet the needs of a significant share of children now, it could be difficult to avoid the emergence in the future of a dependent underclass lacking the skills and knowledge needed for further learning, democratic citizenship, or productive employment in the market economy.

Recognizing the importance of these factors, the 1999 Armenian Law on Education makes basic education (eight years) compulsory for all children, with the universal right to ten years of schooling free of charge (to be increased to 11 years), and makes the state responsible for ensuring provision, access and standards. The question is whether or how this commitment can be met.

Considering the decimation of public funding, it is remarkable that, for the most part, Armenian schools have continued to operate and high enrolment rates have been sustained.[1] This is due mainly to the strong motivation of parents to ensure their children's education and to the dedication of teachers who have continued to work for negligible salaries. Humanitarian assistance has helped, primarily in providing kerosene as an emergency solution for heating

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[1] Primary-secondary enrolment rates are frequently reported to have declined significantly in Armenia since 1991. However, this is not supported by evidence from household surveys, social assessments and other sources, which indicate that enrolment above 95% has been sustained in basic education. The discrepancy is attributed to overstatement of the school age population in official demographic statistics, largely because of unregistered emigration. From the most recent household survey, close to 100% of children aged 7-8 to 14-15 are enrolled in school and well below 20% of this age group are absent from school for more than 3 weeks of the school year. (At the same time, it *is* clear that enrolment rates in pre-school and vocational schools have declined radically).

classrooms. Public expenditure on general education covers little beyond salaries, which are below subsistence level. It is difficult to assess objectively the extent of the impact at this stage on learning achievement, when the necessary evaluation system is not yet in place. What is clear, however, is that, in so far as the crisis has been survived, this has been at the expense of depleting the sector's substantial assets and storing up problems for the future:

- Failure to fund maintenance of buildings and heating systems is generating massively higher costs for the future in major rehabilitation and reconstruction.

- The quality of the teaching force is liable to be progressively eroded by low salaries and poor teaching conditions.

- The effectiveness of teachers is constrained by lack of resources for in-service training, teaching materials or renewal of equipment.

- Capacity to implement important reforms—in standards, curricula, classroom processes, evaluation—is constrained by the same factors.

- Dependence of public schools on non-budgetary sources of funding to meet even basic essential costs is resulting in growing inequities within the system.

- Little headway has been made in reducing excess staff (pupil/teacher ratio is 10, pupil/non-teaching staff ratio is 20, average class size is < 20) or buildings capacity (estimated at least 20% above requirements). The impact of these inefficiencies would be expected to increase over the medium term as wages rise relative to other prices, and as collection is enforced of energy tariffs at cost recovery levels.

If the commitment to maintaining universal general education in Armenia is to be fulfilled without major sacrifice of equity and quality objectives, ways must be found both to mobilize additional funds and to use resources—in particular staff and buildings—more efficiently.

Government Strategy

The government has taken important steps towards addressing these issues. An increasing share of the education budget has been allocated to general schools (grades 1-10). Substantial progress has been made through a Bank-funded project: a new legal and regulatory framework for schools has been established; a detailed strategy has been developed, and is being piloted in 10% of the country's schools, for reforms of school finance and governance which would provide the basis for more effective management of resources at the school level; a number of programs are under way to build school management capacity; and a financially sustainable system of textbook provision, based on school-level revolving funds, now allows access for every schoolchild and teacher to the textbooks they need.

Under the new finance and governance arrangements now being piloted in 154 schools, schools receive lump sum funding from the Treasury, based primarily on the number of pupils. Schools are governed by school councils, comprised of parent, teacher, and local government representatives, and are managed by principals selected by the council. They are able to operate

commercial bank accounts, raise funds themselves from non-budgetary sources including provision of extra-curricular services, make their own staffing decisions, and allocate their funds as they see fit between different inputs (within specified limits, such as minimum salary rates). These reforms, scheduled to be extended to the majority of schools in the country by 2001-2002, will eliminate two important obstacles to efficiency: perverse financial incentives which have discouraged schools from reducing their number of classes; and the rigidity of the line-item budgeting system which has impeded efforts at the school level to improve efficiency. The reforms are also designed to facilitate mobilization of non-budgetary funds by providing formal and transparent channels for this to occur.

These reforms pave the way for more effective use of resources within schools, and would be expected to lead over time to more efficient deployment of staff. It is unlikely, however, that they will be sufficient alone. What is still needed is a strategy for identifying and implementing efficiency measures above the school level. In some cases, making the most efficient use of teachers and buildings will require consolidation of small or under-utilized schools, and re-structuring of neighboring schools, e.g., to consolidate secondary or upper secondary classes in one school. Many schools are operating below capacity, as a result of migration and the drop in fertility rates, as well as original over-design. Opportunities exist, therefore, especially in urban areas, where re-structuring and merging of schools would allow more efficient use of both teachers and buildings. However, policies which involve laying off staff or closing schools meet inevitably with fierce political and social opposition, and they may risk at least short-term damage to school performance through temporary disruption and the impact on staff morale. If they are to be implemented, the justification has to be very strong and widely understood.

The Ministry of Education's Finance and Management Working Group started addressing efficiency issues in 1996, in the process of developing the overall strategy for reforming finance and management of general education. The resulting policy document, Strategy for Reform of General Education in Armenia (MoES 1997), endorsed by the government, included the proposal in principle to increase efficiency though rationalization of staffing and buildings, as well as devolving budget management to the school level. The next stage of work led to the Ministry's Rationalization Plan (MoES, 1998) proposing revised norms for teacher wage rates, class size, pupil teacher ratio (proposed to be increased from 10 to 15), full time teaching hours, and non-staff inputs. Each of the marzes (administrative regions in Armenia) was required in 1998 to compile detailed school level data and prepare a plan for consolidation of classes and schools in the region to enable schools to meet the new staffing norms. Most of the marzes complied with this instruction at least in part. This was a useful preliminary exercise in thinking at the local level about the scope and options for consolidation; however, for political and other reasons it was not followed through. This exercise at the marz level is now being repeated, and a more-integrated approach to rationalization is being considered, through piloting in selected regions, testing the criteria and decision-making processes, and putting adequate incentives in place.

As part of the reform of the budgetary process and the introduction of program budgeting, the Ministry of Finance presented a draft in December 1999 of its first Medium Term Expenditure Framework (MTEF), covering the three years 2000-2002 (MoF, 1999). This proposes significant changes in the level and pattern of expenditure on general education. It assumes a substantial increase in the share of the national budget allocated to the sector, nationwide extension of capitation funding in 2001, and increases similar to those proposed by the MoES plan in the pupil/teacher ratio, the pupil/non-teaching staff ratio, and teachers' wage

rates. If implemented as proposed, it appears that this plan could overcome many of the existing constraints to sustainability and effectiveness of the system.

Purposes of this Paper

This paper examines the case for rationalization of general schools in Armenia by quantifying the future cost impact of alternative policy options in relation to fiscal capacity and by indicating the potential trade-offs in terms of national education objectives. Through a simple model, the paper offers a framework for examining the costs of the system as it is, or with restructuring/rationalization of inputs, and compares these costs with medium term projections of the budget envelope for general education. The model could be adapted easily for use by policy makers in Armenia to explore further scenarios and/or change assumptions.

Chapter 2 examines the structure of inputs and expenditure to general education in Armenia and compares this with international norms and practice. It describes the recent evolution and the changes proposed according to the Ministry of Education's rationalization plan and the government's new draft Medium Term Expenditure Framework for 2000-2002.

In Chapter 3, these alternative proposals are assessed in terms of their fiscal implications and the extent to which they meet the needs of the system. Results are presented of a model projecting the costs to the year 2009 of funding Armenia's general education system under different scenarios: (i) continuation of the system as it is now; (ii) with restructuring according to Ministry of Education proposed norms; and (iii) with restructuring in line with the MTEF. In each case, the "funding gap" is estimated, indicating the shortfall between the proposed funding and the projected actual costs of funding the system adequately—i.e., with pay rates for teachers sufficient to maintain quality of the teaching force, with enough funding for materials and in-service support to enable teachers to teach effectively, and with sufficient allocation for maintenance and construction of buildings to reverse the recent depletion of fixed assets. The methodology and assumptions are explained in the Appendix, together with more detailed projections and sensitivity analysis.

The paper also addresses the practical issues for implementation and points to further measures needed in Armenia to overcome the constraints to structural reform. While the theoretical benefits of (or costs of postponing) rationalization are clear, there are implications to be considered for equity and quality of education services, as well as practical and institutional issues for actual implementation of the necessary changes. Chapter 4 highlights the policy implications of the findings in Chapter 3. It looks at the potential impact of restructuring measures on key education objectives, at the requirements for public and private finance of general education, and at the further measures needed in order to implement rationalization.

The discussion and conclusions relate specifically to Armenia; however, the approaches to addressing these questions are potentially relevant for other countries in the region confronting similar challenges.

2. THE STRUCTURE OF EXPENDITURE AND INPUTS

Evolution of the Education Budget

During the Soviet era, Armenia's education system was comprehensive and generously provisioned, with virtually all services free of charge to the user. At the end of the 1980s, almost 8% of GDP was spent on education, amounting to the equivalent of $292 per capita. However, Armenia experienced one of the sharpest economic crises within the region following the break-up of the Soviet Union. GDP collapsed by an estimated 70%, while the share spent on public education has been reduced to just over 2%. The current level of public funding to the sector is in the region of $33 (PPP equivalent) per capita.

Evolution of the education budget since 1992, in relation to the total budget and to GDP, is shown in Table 1. The 2% share of GDP allocated to public education expenditure in Armenia is low by all standards. It is about 60% below the share in OECD countries and 50% below the average for developing countries. It is also less than half the estimated average for CIS countries.

Table 1: Evolution of the Education Budget in Armenia

Current drams, millions (pre '94, rubles)

	1992	1993	1994	1995	1996	1997	1998	1999 planned
Public expenditure	22,656	303,522	40,978	125,551	133,600	151,912	211,702	239,112
Public education expenditure	4,590	38,308	3,684	13,568	16,717	16,679	18,858	23,017
Share of general educ. in education expenditure				43.7%	39.4%	52.3%	63.2%	70.5%
Share of education in public budget	20.3%	12.6%	9.0%	10.8%	12.5%	11.0%	8.9%	9.6%
GDP	59,068	779,613	187,065	522,256	660,310	798,555	924,000	1,081,000
Share of education budget in GDP	7.77%	4.91%	1.97%	2.60%	2.53%	2.09%	2.04%	2.13%

Source: Ministry of Finance

Since 1994, Armenia's education budget effort has also been low by international standards in terms of share of the total budget. The 10% share of the budget allocated to education in Armenia is somewhat below the average for OECD countries (12.6%), and far below that of the middle income countries which share with Armenia a low rate of public expenditure in GDP. Chili, Korea, Mexico and Jordan, for example, have levels of public

expenditure in GDP closer to Armenia's, around 20%, and they allocate respectively 15%, 18%, 23% and 21% of their budgets to education.

The extreme fiscal constraints have forced hard choices. The structure of the Armenian budget for education (Table 2) has shifted appropriately towards greater priority for primary-secondary education and, to a smaller extent, technicums and universities. This has been balanced by a lower share of funding to out-of-school institutions, and to vocational schools and pre-schools. The transfer of responsibility for pre-school to local governments with negligible fiscal capacity, combined with a fall in demand (due mainly to high unemployment), resulted in the closure of many pre-school facilities which had been operating with very high unit costs. Most of the traditional vocational schools, also with very high unit costs, have either been closed or have adapted to meet private demand for new kinds of training; full restructuring of this sector is still constrained by slow development of labor markets. Data for 1998 and 1999 confirm the broad shift towards international norms in the breakdown of expenditure by sub-sector. From a low of 40% in 1996, the share of the education budget going to general education was increased to 63% in 1998, and was budgeted at 70% for 1999 (Table 2).

Table 2: Structure of the National Budget for Education (%)

	1995	1996	1997	1998	1999
Kindergarten	16.2	19.3	13.1	0.1*	0.0*
General schools	43.7	39.4	52.3	63.2	70.5
Boarding/special needs schools	5.6	6.2	7.0	4.1	2.3
Vocational Schools	5.0	4.8	3.0	2.7	2.0
Technicums	5.8	5.4	7.2	6.6	5.4
Out-of-school institutions	10.9	11.3	3.5	2.6	2.0
Higher Education	12.1	12.5	13.1	15.1	12.8
Other entities	0.1	1.2	0.8	5.0	3.6

* *Note*: Responsibility transferred to local government budgets

Source: Ministry of Finance

Expenditure from All Sources on General Education

The collapse of public funding to general education has been compensated in part by household expenditure and by humanitarian assistance (Table 3). Recent household surveys indicate that private spending on general education amounts to about 1.5% of GDP, comprising informal fees or contributions to schools/teachers, spending on books, stationery and other

personal needs, and payments for private tuition. Considering the income and poverty levels of the country, this expenditure is remarkably high by international standards. Humanitarian assistance to the sector has also been significant but has been declining since the mid-1990s, as the crisis conditions following the 1989 earthquake and 1991 economic collapse are perceived to be over. A new injection of external assistance could be expected if a successful resolution is reached in the conflict between Armenia and Azerbaijan over Nagorno Karabagh.

Table 3: Sources of Finance to General Education

(million current drams)

	1996	1997	1998
Total general education budget	6,208	11,413	10,973
Arrears of utilities	100	200	480
Foreign finance	1,000	1,560	1,156
Private spending*	6,830	8,101	15,386
of which			
Contributions, books, materials	3,891	4,105	13,255
Private lessons	2,938	3,996	2,132

* *Note:* The source for 1996-1997 data is the 1996 household survey. The source for 1998 is the results of the new household survey conducted in 1998-99, which provides a more accurate indication of the annual level and breakdown of private expenditure. Reported private costs have two components: (i) all fees, voluntary contributions to schools, and material costs (uniforms, textbooks etc.); (ii) private lessons. The 1996 survey gives the following results: average fees and material costs are 2,100 drams per month of survey (November) per student for those students whose parents do have such costs; share of students that report such payments is 40%. To get the annual estimation for the country we multiply 2100*.4 by the number of curriculum months per year. Note that for 1996 there was no reporting per student, only for the household as a whole, so expenditures per household were divided by the number of children in school. For 1998, parents reported average annual costs for each pupil in the household (which was 3500 drams per month on average), and the share of students for whom such payments were made was found to be 94%. This result is again extrapolated for the whole country using the number of students. A similar approach was used to obtain estimates for (ii). From the HH survey for 1996, we have an estimate that the average cost per student who benefits from private lessons is 3,200 drams (for 1998 the reported number is 4,800), while 22 percent of students were estimated to pay for private lessons (11 percent actually reported paying in 1998). To get an estimate for the country in 1996, we multiply the number of students by curriculum months and by 3200*0.22 (or 4800*0.11 for 1998). The estimate for 1997 is obtained by extrapolation of 1996.

Source: Ministry of Finance and 1998-1999 household survey.

Public expenditure

The central budget for general schools is still constructed essentially on the former Soviet basis (except for the 10% of schools for which a capitation funding system is now being piloted), with the norms trimmed severely to reflect budget realities. The allocation to each school for salaries of teaching and non-teaching staff, which constitute the bulk of the funding, is based on the actual number of staff, which is based in turn on the number of classes. Salary rates are determined nationally. Allocations for most other expenditures are based theoretically on per pupil norms; however, budget constraints make it impossible to come close to meeting these norms. Funds for school expenses are transferred from the central Treasury to the regional

(marz) authorities, which are responsible for ensuring the appropriate allocation to each school. Expenditures are confined to, and accounted for, by budget line item.

The shortcomings of this approach in current circumstances are (i) non-wage expenditures in practice are treated as residual and crowded out of the budget; (ii) schools have no incentive to use their staff more efficiently (if they reduce staff requirements by increasing class sizes, they receive less funds); and (iii) schools have no flexibility in reallocating expenditures between budget items. As the public funding to schools is insufficient even to cover minimum essential costs, conditions vary substantially between schools, depending on the capacity of the individual school to raise funds from other sources. On the positive side, by keeping funding for general education in the central budget, Armenia has prevented regional differences in revenue generating capacity from exacerbating these inequities between schools. Local governments do not have a role in financing general schools, with the exception of Yerevan city, which contributes on a small scale to school heating and utility costs.

Table 4: Structure and Execution of the Budget for General Education, 1998

(million drams)

	1998 forecast	1998 actual	% execution	% structure
Recurrent expenditure	11,513.6	9,936.3	86.30	93.74
Of which wages	6,805.5	6,732.7	98.9	63.51
Of which stipendia	3.0	3.0	100.0	0.03
Of which wages social contribution	2,177.8	2,121.0	97.4	20.01
Of which total staff cost	8,986.3	8,856.7	98.6	83.55
Of which non salary expenditure	2,527.3	1,079.6	42.7	10.18
Office expenditure	57.6	16.3	28.3	0.15
Business trip	11.0	0.8	7.3	0.01
Communication (telephone)	24.1	22.9	95.0	0.22
Electricity	320.1	174.6	54.5	1.65
Fuel and heating	124.4	39.8	32.0	0.38
Water and sanitation	71.2	51.4	72.2	0.48
Foreign projects	1 563.0	430.0	27.5	4.06
Other non salary expenditure	355.9	343.8	96.6	3.24
Capital expenditure	436.3	664.1	152.2	6.26
Of which new construction	436.3	487.7	111.8	4.60
Of which building repair	0	176.4		1.66
Total budget	11,949.9	10,600.4	88.7	100.00

Source: Ministry of Finance

By the standards of many other CIS countries, Armenia has been relatively effective in curbing budgetary arrears in the education sector. Actual execution of the education budget in recent years has been largely successful in meeting the budgeted salary commitments, which are

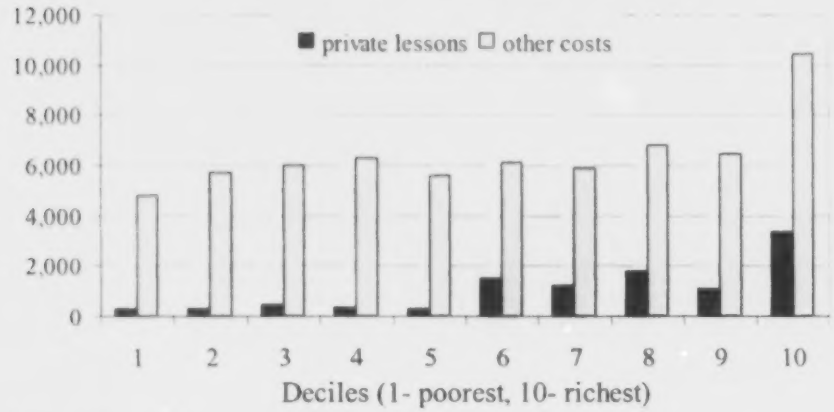
given high priority, although often with delays in payment. In practice, however, even the small amounts budgeted for non-salary expenses are not fully disbursed. In 1998 (Table 4), for example, the budget for staff costs was fully executed, compared with 42% execution of the small budget for non-staff recurrent costs.

Other sources of funding

Judging from survey data on household expenditure, total private expenditure related to general education has almost matched, or even exceeded, budgetary expenditure to the sector in recent years, amounting to at least 1.5% of GDP. This level is high by international comparison, especially considering the low level of incomes. The new household survey results for 1998 provide a more accurate picture of the incidence and breakdown of household expenditure than was previously available. Expenditure on (usually informal) private tuition was reported for only 11% of pupils and accounted for 14% of household expenditure on general education. Expenditure on other items, including contributions to school costs, textbooks, stationery, transportation to and from school, uniforms and other personal items, was reported for all children attending school; about half of this expenditure went to indirect costs such as clothing, meals and transport. These expenditures, unlike the costs of private lessons, were reported to be substantially higher (by as much as 30%) in rural areas. Poor households reported higher indirect costs than the rich.

Based on the most recent household survey, Figure 2 below illustrates average monthly household spending related to general schooling, for those households with children in school, according to household income group. This indicates remarkably little difference overall in the amount spent between poor and better-off households, implying that the costs of schooling account for a much larger share of expenditures of poor than of wealthier households. As in the previous 1996 survey, even the poorest groups reported some expenditure on private lessons but, in this respect, the difference between poor and rich households was very great.

Figure 2: Average expenditures on education for households with school age children, by deciles, drams



Source: 1998-1999 household survey

Informal fees and other private contributions to public schools. From available data it is difficult to quantify the recent impact of informal charges to parents and other fund-raising initiatives at the school level in supplementing public funding. A small sample survey of schools, looking at sources and uses of funds at the school level, suggested that non-budgetary finance is substantial in a few cases, but is negligible for many schools. Most schools levied some kind of informal fee, often for a "maintenance fund," but it would be illegal to make such fees compulsory, and many parents were said not to have the means to contribute. Parents' regular contributions to school costs appeared to be small in most schools: for a school in a relatively privileged catchment area, they amounted to about 10% of the state budget, or US$2.50 per pupil per year. However, in the 1998-99 household survey, the average household reported spending a monthly average of about 700 drams (US$1.50) on formal and informal payments to schools. This varied greatly between income groups, with poorer households (deciles 1-4) averaging only 250 drams, compared with the average of 7,000 drams for wealthier households (deciles 7-10). Translated to the national level, this would add as much as one third to the public budget for general schools, with the distribution between schools depending primarily on the share of wealthier households in each school community. In addition, some schools have succeeded in attracting significant sponsorship from local companies as well as individual private benefactors. The amount of funding that schools are able to raise from non-budgetary sources, what they spend it on, and the extent of variation in this between schools, will become much clearer under the new accounting and reporting procedures attached to the finance and management reforms.

Private tuition. The number of pupils in private primary-secondary schools is still extremely small (0.4% of grade 1-10 pupils in 1999) although it has been growing. Expenditure on private tuition is made primarily by parents of public school pupils for private lessons provided by public school teachers. The scale of this expenditure (as reported in the household survey of that year) was such that it approximately doubled the total income of teachers in 1996. However, the impact appears to have been highly inequitable, concentrated in a few subjects (especially English, math and computer studies in the higher grades) and in wealthier communities. From the 1996 survey, it is notable that even the lowest income group reported *some* expenditure on private tuition, indicating the importance placed by parents on this supplementary tuition. Entrance to public higher education was thought to be almost impossible without extra paid lessons. However, the significance of private tuition in household expenditure appears to have diminished. Although the data are not strictly comparable, results of the most recent survey suggest declines since 1996 both in average household spending on private lessons and in the proportion of pupils for whom such spending is reported (down to 11%). Once again, although even the poorest groups did report some spending, expenditure on private lessons was overwhelmingly concentrated in the higher income groups. For the households that reported any expenditure on private tuition, the monthly average was 5,000 drams (>US$11). These expenses occurred much more often in urban than rural areas: as many as 20% of urban families with children of school age reported expenditure on private tuition, compared with only 10% of rural families; average costs of private lessons were also higher in cities.

Textbook fees. Under the Soviet system, textbooks were provided to all pupils free of charge. The fiscal collapse following independence forced the government to shift these costs to parents, with the result that by 1997 fewer than one in three children had access to textbooks. The cost of a full set of textbooks could amount to as much as US$40 for one pupil (about two

months' salary for the average teacher). In the stakeholder assessment carried out that year, teachers reported the lack of textbooks to be the single most difficult constraint they faced. Since then, a new rental scheme has been introduced, based on school-level revolving funds, which has greatly reduced the costs to parents and made it possible for all pupils to have the books they need. Public subsidy is confined to a 10% annual contribution to the schools' revolving funds, so that book rental fees can be waived or reduced for the poorest pupils. There is growing evidence that, as the number of books in the new scheme increases, more parents are finding it difficult to meet the full rental payments and that some schools are finding ways to subsidize the fee for more than 10% of pupils. From the recent household survey, the poorer households (deciles 1-4) spent a monthly average of 1,500 drams on textbooks and school materials, compared with 2,500 drams by households in deciles 7-10.

Foreign assistance. Most of the support to education from the Armenian diaspora has focused on higher education and boarding schools (for special needs pupils) or orphanages. A few individual schools have benefited from bilateral or other assistance, geared to foreign language instruction and/or methodological reform. Overall, for the costs of running general schools, foreign assistance has been most significant in funding emergency heating of schools during winter, and in some rehabilitation of buildings. (Expenditure under World Bank credits is included in the public budget.) The USAID-funded program of kerosene distribution enabled schools to remain open during recent winters. However, it was intended only as an emergency solution and was terminated after the winter of 1998-1999. At the same time, energy tariffs have been raised towards cost recovery levels and measures are being taken to enforce collection. As a result, the full costs of heating schools now need to be met through the public budget for general education. A number of agencies have provided assistance in school rehabilitation or reconstruction, but meeting only a small fraction of the full needs on a national scale. Even for those schools that have benefited from such assistance, this does not provide a long term solution when the on-going recurrent costs of maintenance are still not accounted for.

Summary of Comparison with International Practice

The comparison with practice in other countries does not imply that international norms are necessarily the best, or the best for Armenia. There is in any case substantial variation between countries. And there is no one obvious country or group of countries with which to compare the Armenian system. In many respects, including basic literacy and participation rates, Armenia is closest to OECD standards, while per capita GDP and wage rates are currently closer to those of third world countries. Comparison with other CIS countries is more relevant in these respects, but most of the countries in transition face a similar need for structural changes to match fiscal realities and the needs of an open, market economy. Nevertheless, where the Armenian system differs radically from the norm in market economies in other parts of the world, this warrants at least close investigation. The structure and funding of general education in Armenia are exceptional in many respects:

- *Level of public expenditure.* Only half the international average share of GDP is allocated to public expenditure on education in Armenia. Other countries with a low tax effort spend about double Armenia's budget share on education.

- *Private expenditure.* The low level of public funding is partially compensated in Armenia by a much larger than average share of household expenditure on primary-secondary education. Most of this expenditure is in the public school system—only 0.4% of pupils are enrolled in private schools.

- *Unit costs.* Per student expenditure on primary-secondary education, in relation to unit costs in other sectors (especially pre-school and VET), is much lower in Armenia than in other parts of the world.

- *Curriculum hours and school structure.* Armenia has ten years of primary-secondary education, compared with the international norm of 12 years. (Most CIS countries have moved to at least 11 already.) The majority of Armenian schools are "complete" schools, covering grades one through ten, unlike the typical structure in other regions where children typically move to different schools for junior secondary or middle school and high school grades.

- *Staffing ratios.* Armenia's pupil/teacher ratio of 10 in general schools is far below half the average for middle income countries, and substantially below even the OECD mean. The discrepancy is even greater for non-teaching staff.

- *Teachers' salaries and teaching hours.* Despite the high share of the education budget allocated to salaries, teachers' wages are very low by international standards in relation both to the national average wage and to per capita income. (Teachers earn 1.5 to 2.5 times per capita GDP in OECD, 2-10 times in developing countries, less than 0.5 in Armenia). At the same time, the number of classroom contact teaching hours required of a "full time" teacher, at only 18, is substantially less than the norm elsewhere. Adding informal payments for private tuition (which is conducted primarily by public school teachers) substantially increases total teachers' earnings. However, distribution of these additional earnings is highly unequal, concentrated in specific subjects/grades, in relatively wealthy and mostly urban communities.

- *Non-salary inputs.* Other school expenditures – including maintenance of buildings, utilities, equipment, and teaching materials – do not come close to meeting the real costs of sustainable operation. As the prices of utilities, equipment and materials in Armenia are not far from world market prices, while wages are exceptionally low, these items would require a significantly larger share of Armenia's education budget to achieve the same balance of inputs.

Restructuring Proposals

The drastic reduction in public funding to the system has not been matched by any significant changes in staffing levels, in the number of school buildings to be maintained, in the number of grades covered in each school, or in the required curriculum hours. The pupil teacher ratio has remained around 10, and average class size below 20. The number of schools, at about 1,400, has not been reduced and the great majority of these continue to be "complete schools" for grades 1 through 10. As a result, the full impact has fallen on teachers' salaries, which are far below subsistence level, and on the quality and quantity of essential non-staff inputs. Private

expenditure and humanitarian assistance have helped to fill some of the gaps in public funding but the incidence is inequitable. The inability to fund the system adequately with the existing capacity of staff and buildings is a matter of sustainability as well as efficiency. Unless some restructuring is undertaken, it seems not only that Armenia could be getting better value from its expenditure on general education, but also that the condition of buildings and the quality and equity of services will continue to deteriorate.

The existing imbalance of inputs to general education in Armenia is clear to everyone concerned. Teachers have the advantage of small classes but are unable to teach effectively without access to the necessary equipment, teaching materials, library resources, laboratory and other supplies, in-service training and other support in adapting to new curricula and other demands. In addition, they must find ways to supplement wages that are below subsistence level. Parents and pupils have the convenience of a primary-secondary school within a short distance of their home wherever they live. However, physical conditions, including winter temperatures, in many schools are poor enough to impede learning and, in some cases, to jeopardize health and safety.

For many in Armenia, the solution to this imbalance is simply to increase the level of budgetary funding so that teachers are paid better and other inputs are adequately financed. Awareness is increasing, however, that this is not realistic under current and foreseeable fiscal conditions in Armenia; also that, even if this could be afforded, some restructuring to allow more efficient use of teachers and buildings would make it possible to produce still better results. The Ministries of Education and Finance have been working on these issues since 1996, with support of the Bank-financed Education Finance and Management Reform Project and Structural Adjustment Credits. The strategy for reform of general education, prepared by the Ministry of Education and endorsed by the government in 1997, included proposals to reduce staffing levels and excess buildings space through consolidation of classes and, where appropriate, consolidation and closing of schools, and to apply the savings to fund other urgent needs of the system. It also proposed radical changes in the structure of school governance and finance—giving schools more autonomy in managing their own resources through elected school councils and providing public funding on a per pupil basis—to introduce the necessary means and incentives for more effective use of resources at the school level.

Ministry of education revised norms, and marz-level rationalization plans

The Ministry of Education's rationalization plan, prepared in 1997, proposed revised funding norms, calculated on a per pupil basis, assuming an increase in average class size to 25 and in teachers' wages to the national average wage. A differentiated approach was envisaged, to account for varying demographic conditions. In urban areas, class size would be increased to an average of 28-30 in grades 1-8 and 25 in grades 9-10, though a combination of class re-grouping and school consolidation, reducing the total number of classes by an estimated 2,240, and the required school building space by 100,800 sq. m. In rural areas, the scope for school consolidation would be very limited because of transport constraints. Reductions in the number of rural classes would be achieved primarily through class regrouping within schools, including consolidation of primary grades into multi-grade classes in very small schools. In this way, it was estimated that the number of rural classes could be reduced by about 740. The result at the national level would be an overall reduction of 10.5% in the number of classes. The matter of rationalization of boarding schools for special needs pupils was to be addressed separately.

The next stage was to require detailed rationalization plans to be prepared at the marz level, with the benefit of full information on local conditions. Not all the marz education authorities complied fully with the requirements. Nevertheless a considerable amount of data was gathered and in some marzes the exercise was taken very seriously. Vayots Dzor, in particular, produced a plan for increasing its pupil/teacher ratio from 8.8 to 13, closing 16% of schools and consolidating classes in others, to achieve annual savings equivalent to about US$100,000. The estimated implementation cost amounted to US$110,000 directly related to the rationalization, including generous compensation to redundant teachers, plus a further $80,000 for renovation of buildings and replacement/repair of furniture. A consolidation plan for Yerevan City involved 21 (10%) of the city's schools, which were operating at half their capacity. Ten of these schools would be closed and the savings applied to wages, maintenance of buildings and other costs for the remaining schools and staff. For a number of reasons, none of these plans were followed up: (i) they were not fully realistic, especially in terms of the time needed for detailed planning, costing, scheduling, logistical preparation, and consultation with stakeholders; (ii) changes in senior officials led to a loss of momentum; and (iii) most fundamentally, the existing budget mechanism could not be adapted to allow the consolidated schools to retain the savings from consolidation. The process has since been revived and marzes are due to submit new plans in mid-2001.

Medium term expenditure framework, and new funding mechanism

Piloting of the new funding mechanism for general schools was introduced in school year 1999-2000 in 154 schools, backed by training of school principals, school council members and accountants. The schools have their own bank accounts and are managing their own budgets. Expansion in 2000 would be limited to a further 50 schools, to allow time to learn from the pilot experience, make necessary adjustments, establish school councils, and carry out training, before nationwide adoption planned for 2001-2.

In December 1999, the government prepared its first Medium Term Expenditure Framework, covering the years 2000-2002. This proposes important changes in the level and pattern of funding to general education and closely supports the rationalization strategy. It envisages an increase to 11.8% by 2002 in education's share of the total budget, allocations to general schools on a per-pupil basis, annual increases of 30% in teachers' salaries, and an increase in the pupil/teacher ratio to 14 by 2002. Expansion of funding for school capital repair and reconstruction is to be supported by proceeds of privatization.

3. MEDIUM TERM SCENARIOS

This chapter highlights some of the results of a model which projects the future costs of universal general schooling in Armenia to the year 2009 under alternative scenarios, and compares these costs with the potential budget resources for the sector. Details of the methodology, assumptions and resulting projections for each scenario are presented in the Appendix.

In broad terms, the results confirm that:

- *The existing problems of the general education system cannot be solved simply through an increase in public expenditure.* Even under the most optimistic scenario for growth of the economy and tax revenue, budgetary resources would continue to be insufficient to fund the full costs of maintaining the primary-secondary education system in its existing form. Adequate funding of the system without any change in staffing ratios would cost four times the existing budget. With the increase envisaged under the MTEF in share of the budget allocated to general education, the costs of maintaining current staffing ratios would still be double the projected budget in 2009.

- *They also cannot be solved simply by cutting back staff.* Even with fairly generous public expenditure projections based on the MTEF, the average class size would need to reach almost 50, making 63% of the teaching force redundant, to allow an adequate rate of pay to teachers and funding of essential non-wage inputs. This would be clearly unacceptable on educational, political and practical grounds.

- *Schools will continue to depend on non-budgetary sources of funding over the medium term.* Under any plausible scenarios of fiscal capacity and staffing rationalization, public expenditure on general education in Armenia will not be sufficient over the medium term to meet the full costs of quality, universal, general education.

It is clear that universal general education of adequate quality cannot be sustained in Armenia without actions on *all* fronts, to increase the level and efficiency of public expenditure, cut back the number of teaching and non-teaching staff, and mobilize extra-budgetary resources. In so far as public schools continue to depend on private sources of finance to meet essential costs, measures will be required to improve the efficiency and equity of private spending and to target public funding to the schools and individuals in greatest need.

Methodology

Three basic scenarios are examined: continuing the system as it is, with no change in staffing ratios or the structure of funding (baseline); restructuring according to Ministry of Education norms for the structure of inputs and expenditure (MoES); and restructuring according to the new Medium Term Expenditure Framework (MTEF). For each scenario, the "funding gap" is estimated, i.e., the gap between proposed expenditure and the estimated full costs of minimum adequate funding to schools, to support quality and equity objectives and allow

sustainability of the system. Estimates are made of the level of wage rates and non-staff costs that would need to be met in Armenia to reverse the depletion of fixed assets, maintain the quality of the teaching force, and provide teachers with the equipment, materials and in-service support they need to teach effectively. These estimates are based as far as possible on country-specific conditions and cost data. For some inputs, they are based on international norms for expenditure per pupil as a percentage of per capita GDP.

Macro-economic, demographic and other assumptions used in the model are explained in the Appendix to this report, together with the projections for each scenario, and illustration of the sensitivity of results to changes in macro-economic and other assumptions. The purposes in this Chapter are (i) to examine the trade-off between teachers' wages and the pupil-teacher ratio, (ii) to indicate the nature and scale of the "funding gap" for each scenario, and (iii) to illustrate the potential impact of restructuring.

Trade-off between Teachers' Wages and the Pupil/Teacher Ratio

Teachers' wages

Two key variables in the model, determining the size of the teachers' wage fund, are the average teacher's wage (in relation to projected per capita GDP) and the pupil/teacher ratio. The current level of teachers' salaries, at only 33% of per capita GDP and 50% of the national average wage, is exceptionally low by any standards and below subsistence level. There is a strong consensus in Armenia that the relative pay of teachers must be increased. The question here is what scale of increase is needed to attract and retain the necessary quality of staff.

The MoES norms would increase teachers' wages to reach the national average wage, or two thirds of per capita GDP. The MTEF proposes annual increases of 30% through 2002, which would have approximately the same impact. Whether this would be sufficient to maintain quality and effectiveness of the teaching force—to attract and retain qualified staff, achieve good morale, and eliminate the need for teachers to supplement income from other sources—is a matter of judgement. The national average wage may not be the best indicator because the formal labor market is still undeveloped and formal sector wages currently represent only a small share of incomes in Armenia. Ideally, the average teacher's salary would reach at least 100% of per capita GDP (teachers earn 1.5 to 2.5 times per capita GDP in OECD countries, and 2 to10 times in developing countries), to avoid the need for teachers to spend time on other income earning activities (including giving private lessons to their public school pupils). However, this is a problem affecting all public sector employees in Armenia. The increases proposed in the MTEF may be the most that is realistic in the circumstances.

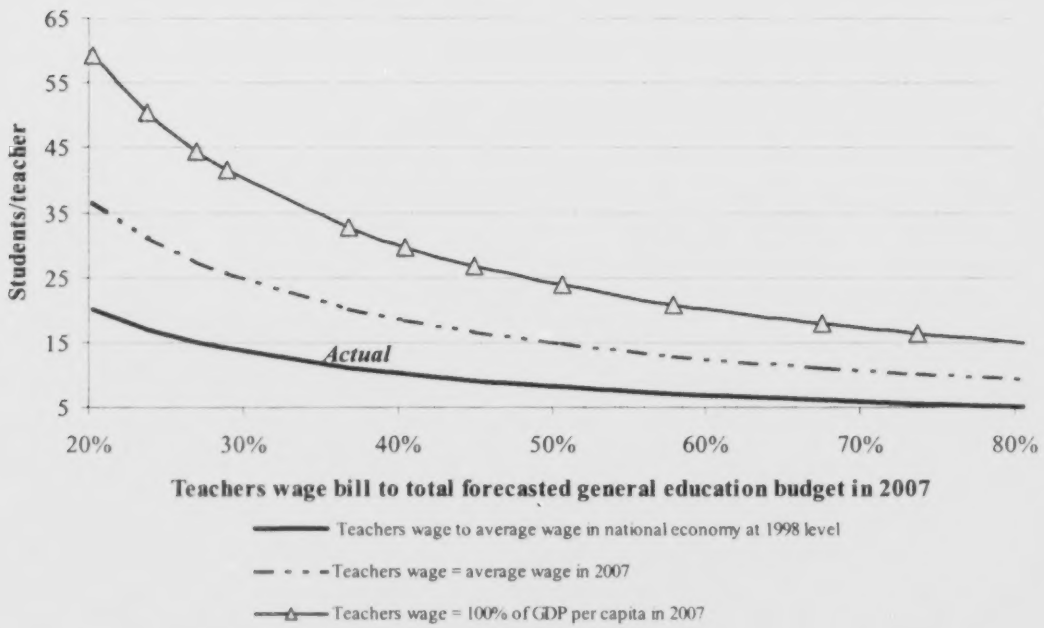
For our estimate of the minimum "adequate" level of funding, we take the increases in teachers' wage rate proposed for the next three years in the MTEF, and assume that this same rate of increase continues until the average teacher's wage reaches 100% of per capita GDP (in 2008). This would still be below international norms for teachers' wages in relation to per capita GDP, but may be close to what is warranted in the specific conditions in Armenia.

Number of teachers and average class size

In relation to standards even in wealthy economies, classes in Armenia are small (average 20) and the number of teachers per class is still very high (about 1.9), resulting in an exceptionally low pupil/teacher ratio. Both the MoES and the MTEF scenarios envisage increases in the pupil/teacher ratio, from 10 to 15 and 14 respectively. The MoES also proposes a reduction in the number of teachers per class. These proposed reductions in the teaching force, although significant, would merely bring Armenia in line with the staffing levels typically afforded in the wealthiest countries. The current level of non-teaching staff in Armenia, at 1.1 per class, is even more excessive by international standards than the level of teaching staff. The MoES norms also propose a reduction in this ratio.

Figure 3 illustrates the basic trade-offs within the education budget between the pupil/teacher ratio, teachers' wage rates, and the scope for funding the non-salary costs of running schools. It leaves no doubt that increases in the rate of compensation to teachers in Armenia are unaffordable without a major rationalization effort in the education system.

Figure 3: Teachers' wages and students/teacher ratio: tradeoff under MTEF budgetary forecast



Source: Authors computations.

- The lower line in the graph illustrates the relationship between the pupil/teacher ratio and the share of the budget required for the wage fund in 2007 (assuming substantial growth in the general education budget based on MTEF projections) if teachers' wages remain at only half the national average wage.

- The middle line shows the same trade-off if teachers' wages are raised to the national average. With no change in the pupil/teacher ratio, an increase in the average teacher's wage just to the national average wage would consume 67% of the projected general education budget on teachers' wages alone in 2007.

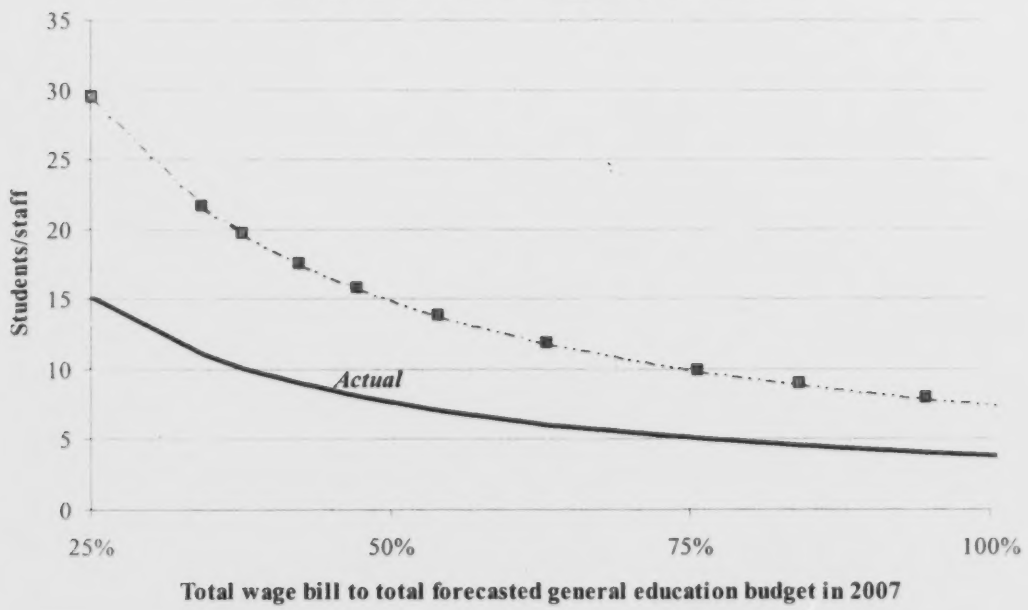
- If the average teacher's wage was to reach 100% of per capita GDP by 2007 (the upper line in the graph), even with an increase to 15 in the pupil/teacher ratio, the teachers' wage bill would still represent 89% of the budget for general education.

Figure 4 shows the picture for the total wage fund—including non-teaching as well as teaching staff:

- The lower line in the graph illustrates the relationship between the pupil/staff ratio and the share of the budget required for the wage fund in 2007 if education staff wages remain at their present level in relation to the national average.

- The upper line shows the result if wages in the education system are raised to the national average. With no change in the pupil/staff ratio, an increase in the average wage of school staff just to the national average wage would consume 83% of the projected general education budget on wages alone in 2007.

Figure 4: General education staff wages and students/staff ratios: tradeoff under MTEF budgetary forecast



Source: Authors computations.

Our estimates of the full costs of adequate funding of schools (explained in the Appendix) suggest that, if all non-staff inputs to schools were properly funded, including maintenance and heating of buildings, other utilities, equipment, and teaching materials, then only around 25% of the MTEF projected budget for general education would remain for the wage fund. [This percentage varies slightly between scenarios, since a reduction in the number of classes is assumed in the model to have some impact in reducing maintenance costs.] To fund all these inputs adequately *and* to pay an adequate wage to teachers within the projected budget would mean increasing the pupil/teacher ratio to 29 and average class size to 45-50. Such a radical restructuring would obviously not be feasible or desirable. If there were no change in the pupil/staff ratio, and if all non-staff inputs were adequately funded, the MTEF projected budget would allow an average wage to school staff of a mere 15% of per capita GDP in 2007.

What If Nothing Is Done? Continuing the System As It Is Now.

The baseline case takes actual per pupil ratios in 1998 as given and extends the costs into the future with a constant growth rate. All physical inputs are assumed to stay constant at the existing levels (number of pupils per teacher, number of classes per school, number of non-teaching staff, electricity consumption, all non-wage expenditures). The key ratio in the model -- the wage rate of teachers to the average economy's wage rate -- is projected to remain at the existing level of 53%.

This scenario would require for general education only an estimated 5.5% of the total consolidated government budget by the year 2007, clearly a manageable target, up from 4.3% in 1998. However, this would be at the cost of drastic depletion of fixed assets as well as deterioration in the quality of education.

This is not an acceptable scenario in terms of education objectives and sustainability. With no improvement in wages of teachers relative to the national average wage, or in resources for in-service training, it would be difficult to sustain quality of the teaching force. Many schools would be forced to close for part of the winter because of lack of heating. Learning outcomes would also be affected by lack of teaching materials and essential equipment. Inequities between schools in the quality of education would continue to increase, because of different capacities of local communities to raise funds for essential non-salary inputs. Continuing to defer regular maintenance and repair of school buildings would generate escalating costs for the future in major reconstruction. Physical conditions in an increasing number of schools would be bad enough to impede learning. And the potential closure of some schools for health and safety reasons could jeopardize the principle of universal access.

Quantifying the future financing gap

The total theoretical "public funding gap" for the baseline case—the difference between projected actual budgetary expenditure on general education and the estimated full annual costs of funding the system adequately with baseline staffing ratios—would amount to 2.8% of GDP in 2007. Some of this gap would be met by private finance, which is projected to continue at its estimated current rate of 1.5% of GDP; however, the impact of private finance is likely to be less socially efficient and equitable. The remainder would be neglected, resulting in further deterioration of physical assets, and of education quality and equity.

This funding gap consists of four main components: **teachers' rate of pay,** at only 37% of the level assumed to be needed; arrears on maintenance and reconstruction of buildings; inadequate spending on heating and other utilities; and insufficient supply of other inputs, especially teaching equipment and materials.

The current level of spending on **capital maintenance**, even when private and foreign expenditure is included, amounts to only about one third of the estimated need. In the current situation the total costs of bringing the physical assets to normal conditions are estimated at 2.7 times the total existing budget for general education. Continuing the existing spending patterns into the future would raise this ratio to 4.5 by 2010.

Until now, **heating costs** have been almost totally neglected in the education budget, covering only 3% to 5% of the estimated costs of fully adequate heating of all schools. Part of this gap has been covered by foreign assistance, through the USAID-funded program for kerosene distribution, by private contributions, and by arrears to the power company. These sources together, however, were sufficient only to heat classes during the winter season to an estimated average temperature of 12 degrees Celsius. Now that the USAID program has been terminated, utility prices are being brought to cost recovery levels, and collection is being enforced, the costs of school heating have to be incorporated in the education budget. Recent expenditure on **electricity** for needs other than heating has met only one third of the realistic norm.

The category of **other inputs** covers a wide range of goods and services, from textbooks and other learning and teaching materials, library resources, equipment, and laboratory supplies, to communications, transport, in-service training, etc. The required expenditure is small in relation to the total education budget but the impact on teacher effectiveness is great. Under recent fiscal pressure in Armenia, these have been treated as a residual item, so little has been budgeted and even less spent. Current expenditure is less than 0.1% of per capita GDP per student. The average annual per pupil expenditure in OECD countries is about 2.9% of GDP per capita, which is assumed here to be the appropriate level for fully adequate funding.

Using an increase in public expenditure alone to close the estimated funding gap would mean allocating **one fifth of total public expenditure just to general schools**, which is clearly not realistic. To finance the system adequately without any reduction in staffing ratios or buildings capacity would require close to 4% of GDP to be allocated to general education alone by 2007. This clearly exceeds the capacity of the government, even with the best progress that could be envisaged in improving tax collection.

The Impact of Restructuring Proposals

The **Ministry of Education's plan** assumes quite rapid movement towards more efficient staffing norms, and specifies country-specific norms for maintenance, utilities and physical inputs. The MoES norms for heating, power and maintenance are all above 90% of our estimates of what is needed for fully adequate funding of the system. Teachers' salaries would be increased only to the national average wage. Implementing these proposals in full, however, would exceed the projected budget in 2007 by 60%.

Under the **MTEF scenario**, the total planned expenditure is tailored to budget projections. This scenario gives a slightly more conservative plan than the MoES for key structural changes, but represents a major advance in the level and structure of funding in comparison with the baseline. As a result, although the "funding gap" is still significant, it is greatly reduced in comparison with the baseline scenario. Key inputs that remain under-funded are: teachers' salaries (still below the GDP per capita benchmark); buildings maintenance (at 80% of estimated need) and heating costs (35% of the estimated need by 2007); and "other inputs," including essential equipment and teaching materials, which are seriously neglected.

Impact on number of teachers and classes

The outcome for each scenario in terms of the absolute reduction in number of teachers and classes is shown in the table below. Although the MoES scenario envisages a slightly higher pupil/teacher ratio, it has a smaller impact in reducing the number of classes because it also proposes a reduction in the ratio of teachers per class (to approximately the level pertaining in OECD countries).

Table 5: Number of Teachers and Classes by 2007

	Teachers	Classes
I. Baseline – Continuing with present	52,790	28,165
II. MTEF	42,143	22,686
III. Ministry of Education Plan	39,333	23,600*
Memo: Applying OECD average class size and pupil /teacher ratio	40,411	23,600

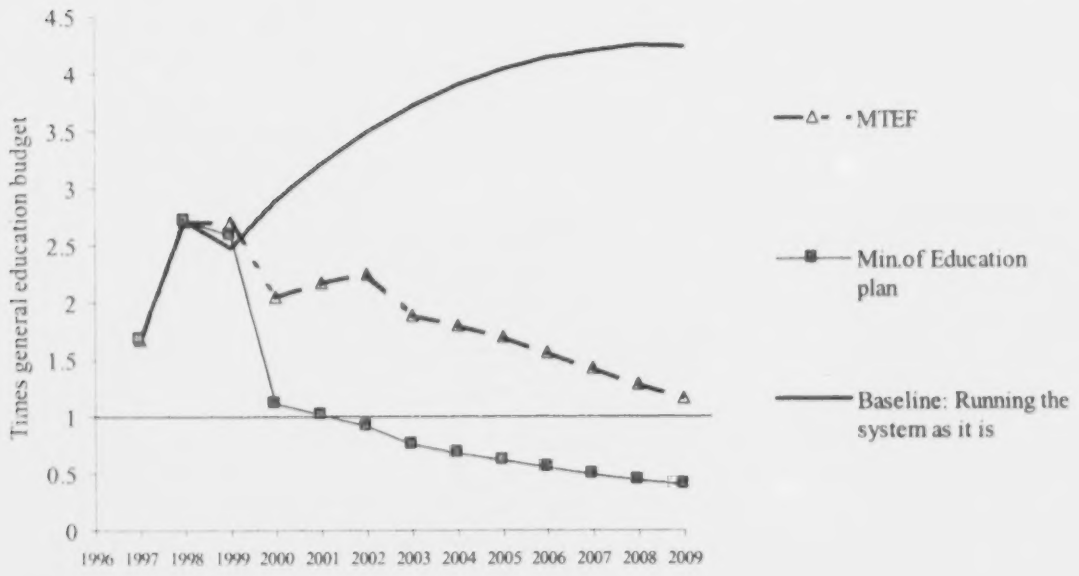
* *Note:* The Plan envisaged in the short term reducing the number of classes to 25,300; numbers given in the Table above reflect the long-term objective to reach OECD average ratios.

Source: Authors computations.

Impact on deterioration of physical infrastructure

The estimated change in the level of capital arrears under each scenario is shown in Figure 5. The level of funding proposed under the MTEF would gradually reduce the arrears in capital expenditures and rehabilitation to a level that is comparable to the annual budget for general education, a clear improvement on the existing situation. The MoES funding norms would substantially solve the problem of capital depletion by the year 2010.

Figure 5: Capital renovation needs and accumulated arrears on maintainance to total general education budget under main scenarios

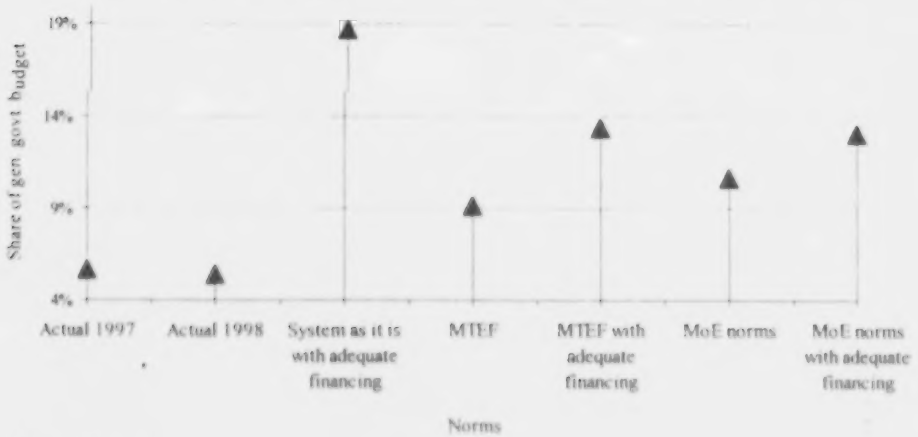


Source: Authors computations.

Conclusion

Our analysis indicates (as illustrated in Figure 6) that expenditure norms proposed by the Ministry of Education are fairly realistic in terms of the needs of the system, but they would exceed even optimistic fiscal projections. The Medium Term Expenditure Framework proposed by the Ministry of Finance falls short of meeting the needs of schools in some crucial respects, although it represents a substantial advance in terms of both level and structure of funding. However, the changes proposed in staffing ratios and class sizes in both the MoES and the MTEF scenarios are conservative by international standards, and would serve only to reduce staffing levels to those prevailing in the richest economies. It is likely, therefore, that Armenia could achieve better education outcomes within its resources by increasing the pupil/teacher ratio beyond the level envisaged in the MTEF, say to about 20—giving teachers larger classes but paying them more and supporting them with the necessary equipment, materials, facilities and services.

Figure 6: Share of the state budget required by general education to cover norms by 2007, baseline macro assumptions

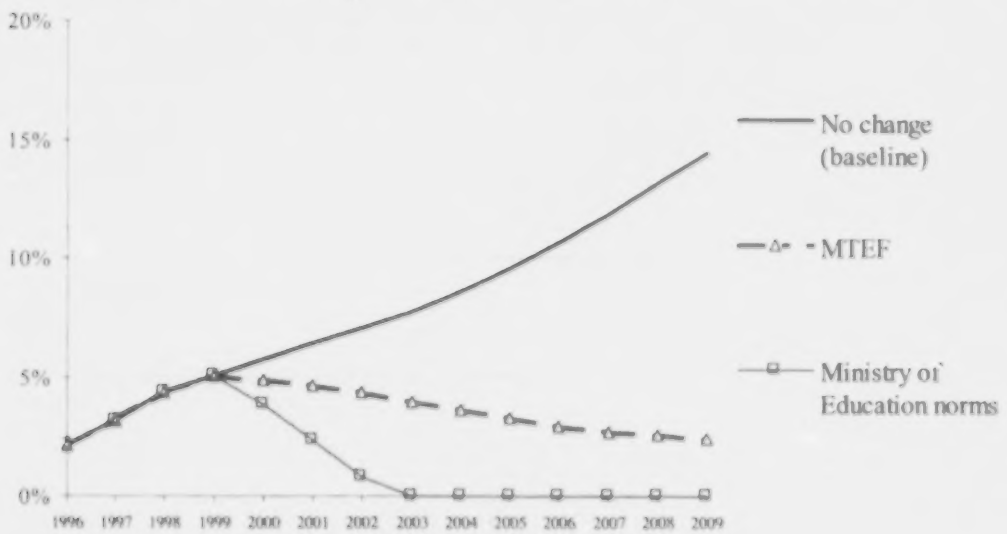


Source: Authors computations.

Total financing gap

When other, non-budgetary, sources of financing are taken into account, the prospects for closing the financing gap become less daunting. The scale of the cumulative shortfall in total funding, including private expenditure and foreign/humanitarian assistance, under each scenario is depicted in Figure 7.

Figure 7: Cumulative financing gap (% of GDP): difference between total needs and spending from all sources since 1996



Source: Authors computations.

It is assumed here that private financing to general education continues at its present share of about 1.5% of GDP, as estimated primarily from the 1998-99 household survey. (This tends to overstate the potential impact of private financing on the funding gap, in so far as some 40% is accounted for by indirect costs of schooling such as meals, clothing and transport.) With MoES funding norms, the financing gap would be eliminated. Under the baseline, no-change scenario, *the cumulative shortfall would reach* 14% of annual GDP by 2009, while the MTEF plan would reduce this to just over 2%. This suggests that, with measures to improve the efficiency of private spending, and a more ambitious plan for rationalizing the use of staff and buildings, the MTEF plan would not be too far off.

Closing the gap with a pupil/teacher ratio of 20

Setting aside the political and practical difficulties of restructuring classes and reducing the teaching force (see Chapter 4), a pupil teacher ratio of 20 for primary-secondary education would be not be an excessive target for Armenia. This ratio would still be substantially below the norm in middle and lower income countries, and very close to the ratio in some high-income countries (including Germany, the UK, Ireland and New Zealand, for example.) If this target could be reached within the next five to ten years, and if further measures could help to channel private finance as efficiently and equitably as possible, and assuming that some of the costs of restoring the physical condition of buildings could be met from donor resources and proceeds of privatization, and of course that the MTEF projections of public expenditure in the sector can be fulfilled, then the essential costs of maintaining universal general education in Armenia could be met.

The model was used to test the results for a fourth scenario, in which

- the pupil/teacher ratio is increased to 20 by 2009;
- teachers' average pay is progressively increased to 100% of GDP per capita by 2008;
- enrolments increase with extension of the curriculum from 10 to 11 years from 2002;
- all key inputs to schools are "adequately" funded.

In this case, the total costs would exceed the MTEF projected budget envelope by only 30%, (amounting to about 0.5% of GDP) in 2009. With appropriate supporting policies, this would reduce the dependence of public schools on non-budgetary sources of funding to a manageable level.

It is interesting to note the radical change that this scenario would present in the structure of finance. Although the average teacher's salary relative to national average earnings would be greatly increased (from 33% to 100% of GDP per capita), the share of expenditure on general education allocated to wages would decline from 75% to 45%.

4. POLICY IMPLICATIONS

The above analysis provides a hypothetical indication of the costs of maintaining the existing capacity of staff and buildings for general education in Armenia, the potential benefits of rationalizing the use of staff and buildings, and the nature of the trade-offs involved in alternative strategies. It demonstrates that adequate funding of the system over the medium term will require strong policy measures to effect changes on three fronts: restructuring to allow more efficient deployment of teachers and buildings; higher priority to general education within the budget; and more effective mobilization of private resources. To close the "funding gap" through restructuring alone would require an average class size approaching 50, which is clearly unacceptable and would in any case be impossible to implement. Using an increase in public expenditure alone to close the gap would mean allocating one fifth of total public expenditure just to general schools, which is clearly not realistic. In the short run at least, it is inevitable that public schools will continue to depend to some degree on non-budgetary sources of finance; the challenge here is to minimize the resulting inequities between schools and disadvantage to the poorest families.

Restructuring to Meet Education Objectives

The reason for improving efficiency is to make the most progress possible with available resources to meet national education objectives—for raising standards, maintaining equity and universal access, and supporting social and economic development. The program of school rationalization is justified in so far as it contributes to these objectives and is closely integrated within the overall education policy framework (including reform of school governance, management, curriculum, standards, assessment, teacher qualifications and training, and the linkages with pre-school, special education, and technical and higher education).

The scope for rationalization

The analysis in Chapter 3 indicates that a doubling of the pupil/teacher ratio, to about 20, would be required over the medium term to enable Armenia to sustain compulsory basic education of the appropriate quality to support national economic and social objectives. On the basis of international experience and research, this reduction in staff would not imply an adverse impact on learning achievement: any disadvantages of larger class sizes would be more than offset by the benefits of being able to afford better support to teachers. Evidence on the impact of class size on learning achievement is not conclusive, and most of the relevant research has focused on the impact of reducing the size of large classes, rather than consolidating small ones. Nevertheless, even in education systems with very low staffing ratios compared to Armenia's, researchers have found that investments in teacher training and in extending the length of time in school appear to have more impact on learning outcomes than reducing class sizes. Most studies have found surprisingly little correlation between class size and achievement when other factors are controlled for. This seems to be borne out in Armenia, where some of the schools with the highest reputations have classes double the national average size. The pilot Education Management Information System found in 1997 that rayons with smaller than average class size were at a slight disadvantage in national examinations (without controlling for other factors).

In practice, the actual scope for regrouping classes or for consolidating schools can only be determined at the local level[2]. The national average class size in Armenia conceals wide variations between districts, and extremely small classes are found in urban as well as rural areas. The aim would be to reduce this variation—to reduce overall staffing levels by consolidating very small classes rather than by creating some very large ones. Similarly, the estimate at the national level of 20% surplus school buildings capacity conceals a number of overcrowded schools. The real options for children in very small schools, or in schools that are operating at a fraction of their buildings capacity, depend on detailed information on local conditions (condition of the buildings, distance/transport to neighboring schools, potential rental market for surplus space, demographic trends, etc.). Relevant data from the regions are not yet fully consistent or complete. Clearly the scope for improving efficiency is much greater in areas of high population density. Over time, teachers' salaries would be expected to rise relative to transport costs but at present it can be less expensive to hire a teacher for three children than to transport the children to the next village. In addition, national security policy dictates the maintenance of schools in remote border villages, however small the number of children. Nevertheless, preliminary plans that were prepared for some districts indicate that even in rural areas there is scope for rationalization.

Relevant policy measures

This study focuses on input norms in order to clarify the magnitude of shortfalls in the existing level and structure of funding to general education in Armenia, and to assess the cost implications of alternative approaches to restructuring. This does not imply, however, that controlling inputs at the school level is the best way to promote the quality or efficiency of education. Schools with more resources do not always produce better results, and the particular balance of inputs that works best in any given school depends on a range of local as well as national conditions. This is recognized in Armenia's strategy for reform of school finance and management, to allocate funding to schools on a capitation basis and give them autonomy in managing their own staffing and budgets. These reforms involve some shift in focus by central government towards defining objectives for learning outcomes, assessing the performance of schools in achieving these outcomes, and holding schools accountable for their results. With appropriate support, this strategy could be expected to lead over time to more efficient allocation of resources within schools, including higher pupil/teacher ratios, and hence to better outcomes with the given level of funds.

The scope for improving efficiency will also depend on a range of central policy decisions for the sector, relating to national standards, curriculum and assessment, teacher training and methodologies. For good reason, the Ministry of Education proposes to introduce a new 11-year curriculum beginning in 2002. Armenian children begin school one year older and finish one year younger than the international norm. This compression of the curriculum puts excessive pressure on teachers and pupils to cover the required knowledge content in the time available, especially as new subjects are being added to the curriculum, inhibiting the adoption of more active learning methods and a more qualitative approach to assessment and evaluation. In the

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[2] The model for this study uses a proxy for the scope for more efficient use of buildings—assuming simply that reduction in the number of classes results in proportionate reduction at the national level in the costs of heating and maintaining buildings.

design of the new curriculum and associated teacher training and materials, it will be important to incorporate measures that can facilitate improvements in efficiency as well as quality.

The pupil/teacher ratio is a function of average class size and the average number of teachers per class. Factors that are keeping down the average class size in Armenia, or keeping up the number of teachers per class, include: the prevalence of very small schools (in small, remote communities, or due to demographic movements), combined with poor transport infrastructure; the expectation that every school should cover all 10 grades; the relatively high degree of specialization by teachers, related to an excessively fragmented curriculum; and the relatively small number of specified "full time" teaching hours per week. A range of measures can support efficiency without jeopardizing education quality or the principle of universal access:

- Use *multi-grade classes*. For very small schools that cannot be consolidated because of transport or strategic constraints, primary classes can be consolidated in multi-grade classes. With appropriate training and materials for teachers, this approach can have learning benefits as well as improving efficiency. This is more challenging but can still be successful in higher grades. Support can also be considered through distance learning and sharing specialist teachers between several schools.

- *Use multi-subject teachers.* Training teachers in more than one subject can help to reduce the number of teachers per class. Combined with the current proposals of the Ministry to improve subject integration in the new curriculum, this measure could also have pedagogical benefits.

- *Merge schools.* Restructuring schools, e.g., merging small or underutilized schools, consolidating, secondary or upper secondary classes in separate schools, can also facilitate larger classes and more efficient deployment of teachers, and may improve learning outcomes by giving upper secondary pupils access to a larger number of qualified teachers.

- *Limit secondary level options.* Economies of scale are greatest when the range of options available to high school pupils – both in curriculum/specialization and in type of school – is limited. Postponing vocational specialization also has the benefit of giving all pupils the basis they need for adaptability in response to changing labor market demand.

- *Increase teacher hours.* Increasing the number of teaching hours per week required for a "full time" teacher can be linked explicitly to salary increases (as can increases in class size).

The new curriculum and related training should be designed to facilitate these measures. At the same time, central policy on all these measures needs to be made clear to local authorities and schools, so that rationalization plans made at these levels match nationally-set requirements and incorporate the full range of options. The decision on curriculum extension has implications for planning rationalization at the local and school levels as the resulting increase in the number of enrolments would absorb some proportion of the currently excess buildings and teacher capacity. Coordination is also needed with policy for rationalization of the boarding schools for special needs pupils: many of these children are institutionalized because of poverty rather than

disability and measures to support their integration in local day schools would have humanitarian and efficiency benefits.

Improving Public Expenditure

Medium Term Expenditure Framework

The government's new Medium Term Expenditure Framework for 2000-2002 is well designed to support the reform strategy for general education. The projected level of expenditure is still low by international standards in terms of share of GDP but, according to our analysis, can come close to addressing the needs of the system *if*

- the projected increases in pupil/teacher ratio and in teachers' salaries continue at the same rate until 2008, and the short term costs of rationalization are accounted for.
- private expenditure amounting to at least 0.5% of GDP can be mobilized effectively for the costs of public schools.
- other sources of funding, including privatization proceeds, are tapped for major school repair and reconstruction.
- attention is given to minimum needs for furniture, equipment and teaching materials, which in effect are treated as residual items in the budget.

There is unlikely to be much room for further increase in the share of the total education budget allocated to general education. There is undoubtedly room to improve the efficiency of public spending on VET and higher education (where unit costs are still higher than would be expected in relation to general education) and to support further diversification of funding. Nevertheless, the costs of re-orienting and equipping these sectors to meet new demands over the next decade would be significant. Central funding to pre-school has been re-introduced on a very small scale, to allow general schools to introduce a preparatory class for 6-year olds where there is strong demand for this, and to provide direct support to families through dissemination of pre-school materials. Attention will be needed in all these sectors to targeting public subsidies on the basis of need. Considerable scope exists for savings through rationalization of the existing boarding schools for pupils with special needs (or simply family poverty) and re-integration of many of these pupils into their own communities and local day schools. General schools would receive a larger capitation grant for special needs pupils. For the medium term, however, resources would be needed to build the necessary capacity in communities and general day schools.

School funding mechanism

The MTEF schedules extension of the new capitation funding mechanism to all schools in the country (with the exception of small schools in the remote and strategically important villages) by 2002. Successful implementation of this major reform will need a much more concerted focus by both Ministries of Finance and Education on:

- *Capacity building needs at the school level.* Meeting the schedule would require very rapid action in extension of training and registration of school councils. Training has already been carried out of school principals, accountants and council members of the pilot schools—just over 10% of the schools in the country. Sources of funding need to be confirmed for extending adequate training to all schools; not all these costs are accounted for under the Bank-funded project.

- *Transparency and reliability in disbursements to schools.* Implementation of the pilot phase was jeopardized by long delays in payments to the pilot schools and by uncertainty at the marz and school levels concerning the amount due to each school. These difficulties have led to an impression that the pilot schools are in fact even worse off than non-pilot schools in the amount and regularity of funding, seriously undermining the confidence of all schools in the new system. If funds continue to be channeled though the marzes, it should be clear that there is no discretion at this level on the amount or timing of payments to schools.

- *Maintaining adequate incentives in funding mechanism.* The new funding formula includes essential adjustments to ensure that no school receives lower funding under the new system than it did before. The allocation also varies depending on which size category the school falls into. Over the medium term, some form of "isolation index" (as introduced in New Zealand, for example) might be more effective in maintaining appropriate incentives while still accounting for the higher costs of small, isolated schools.

Mobilizing Non-budgetary Resources and Limiting Inequities

The mixture of public and informal private finance in public schools tends to promote inequities and abuse. Important steps have already been taken to limit these effects:

- The school finance and management reforms are designed to encourage voluntary contributions to schools through school councils, providing transparent and formal channels for non-budgetary funding, and allowing schools to raise funds by charging for extra-curricular services, renting classroom space, etc. Unfortunately, the capacity of schools to raise funds in this way will still depend to a large extent on the wealth of the local community.

- The new textbook system has been highly successful in channeling household expenditure on textbooks to achieve much more efficient and equitable results, through higher quality, reduced costs to parents, and universal coverage. Nevertheless, it appears (e.g., from the 1999 social assessment) that textbook rental fees are already stretching the ability to pay of a significant proportion of parents. This suggests that the scope for any further formal charges or fees related to the core curriculum, even if they were legally and politically acceptable, would be constrained by the difficulties of targeting subsidies to those unable to pay.

- The legal and regulatory framework supports development of independent private schools and this sector is expected to continue growing. The impact is still small, however, with private schools serving only 0.4% of grade 1-10 pupils.

In the circumstances, continuing dependence of public schools on non-budgetary finance presents a major challenge and will call for:

- *Close monitoring* of the incidence of private expenditure and of differences (between schools, regions and socio-economic groups) in access, enrolment rates, attendance rates, drop-out rates, assessment results, selection for higher education, employment and earnings of school leavers etc. Sources of information will be improved with completion of the planned census, further analysis of the new household expenditure survey results, accounting data from schools that are managing their own budgets, data from the new EMIS (now being implemented) and from the new assessment system (now being designed).

- *Design and testing of measures to moderate inequities*. For example:

  - assessment of the effectiveness of school-level targeting of textbook subsidies and of the potential for extending such a mechanism to other subsidies;

  - measures to promote sponsorship of the neediest schools by local companies and through twinning partnerships with diaspora and other schools outside Armenia;

  - development of a mechanism to target funds to schools in the poorest communities through a poverty index in the capitation funding formula.

- *Sustainability of schools' revolving funds for textbooks*. This scheme has been uniquely successful, providing a model for other countries in the region, but its sustainability cannot be taken for granted. Schools have proved themselves highly competent in managing the new system to meet the needs of all pupils, and sustainability will depend on keeping control at the school level. This is liable to be undermined by political promises to provide "free" textbooks to primary grade pupils, when in practice the Treasury has been unable even to meet its commitment to subsidize the rental fees for the poorest 10% of pupils by augmenting schools' revolving funds. From the recent household survey, it appears that better-off households have been the main beneficiaries of free textbooks.

Implementing Rationalization

Implementing any major education reform is difficult, especially when this includes rationalization of staffing and schools. Experience of countries that have succeeded can provide valuable guidance and source of advisors. Substantial work has been done in Armenia at the national level in assessing the need and scope for rationalization and defining appropriate criteria. General awareness of the issues involved, within central government and in the regions, has greatly increased. At the regional level, most of the marz education authorities have gathered relevant data and some developed quite detailed plans with cost estimates. Several factors, however, have operated against actual implementation of these plans:

- lack of continuity in commitment to the reform due to high turnover of Ministers of Education and other key officials.

- general under-estimation of the requirements for detailed planning and implementation.

- financial disincentives of the budget system, basing most of the funding to schools on the number of classes.

The latter constraint is now being resolved through the introduction of funding based primarily on the number of pupils. The other factors have still to be fully addressed.

Strength and continuity of leadership

Turnover of Ministers of Education and other key officials in central and regional positions has made it particularly difficult to sustain continuity and momentum of the reform process.

- More attention is needed to building a core team of change agents, committed to the reforms, in the Ministry and key regional positions.

- The possibility of setting up an independent/advisory council for education reform could be considered to help sustain continuity and forge ties between reformers and societal groups.

Clarification of roles and responsibilities

Under the 1999 Education Law and the new regulatory framework for school-based management in Armenia, decisions relating to the allocation of resources within the school—including selection, hiring and firing of staff—are the responsibility of the School Council, within parameters set by central government. The Ministry of Education remains responsible for standards, core curriculum, assessment, teacher training and certification. Support to and supervision of schools is channeled through education offices at the marz level, the deconcentrated regional authorities whose heads are appointed by central government. The only elected local authority has been established recently at the community, or "hamaink" level and the role of these hamainks in schools has not been fully clarified. When the pilot phase of the school finance and governance reforms was being designed, there was a move by government to decentralize significant responsibilities to the hamainks, including delivery of education and other services. To test the potential role of hamainks in general schools, one third of the schools selected for the pilot were transferred to hamaink authority, while two thirds remained under marz supervision. The thrust for broad decentralization was soon reversed, and the subsequent experience of the pilot schools has demonstrated that most hamainks, being small and inexperienced, lack the capacity to take on responsibility for general schools.

To achieve the necessary reductions in staffing ratios, coordinated efforts will be needed at every level. Since individual decisions concerning the number and deployment of staff within the school are made at the school level, the role of central government in this respect is simply to ensure that the necessary policy framework and incentives are in place for schools themselves to achieve the best possible results within their resources. Under the new school finance and management arrangements, schools could be expected to move naturally to more efficient staffing levels, without need of any central orders for staff retrenchment.

The difficulty arises in cases where making more efficient use of both teachers and buildings depends on decisions made *above* the level of the individual school, i.e., consolidating

small or underutilized schools or restructuring grades between schools. Decisions on school consolidation will inevitably be controversial and will need to be endorsed and enforced from the top. At the same time, these decisions are unlikely to be accepted and implemented successfully unless local communities have been consulted and involved in the planning process. The hamainks are too small, many having only one school, to assume responsibility for consolidation decisions; however, they would be expected to play some role in the planning process. The marzes are charged with the key role of preparing rationalization plans and submitting these for central government approval. They would also be responsible for ensuring implementation of approved plans. It is possible, however, that marzes cover too large an area (averaging more than 100 schools each) to promote the necessary local participation in the debate on options, unless smaller catchment areas are defined within each marz for this purpose.

- The role of hamainks in the primary-secondary school sector needs to be better defined. Following the pilot experience, it has been wisely decided that when all remaining schools assume their new, more autonomous, status, they will remain under the overall supervision of the marz authorities. Nevertheless, it would be appropriate for hamainks to be formally represented in School Councils.

- For school consolidation and restructuring, it might be useful within each marz to define two to four catchment areas, or "education zones," within which the specific options and requirements for school consolidation would be considered. This could facilitate participation in the debate and local ownership of decisions, while leaving clear responsibility with the marz authorities for ensuring that the process and the resulting plan conform to national and regional guidelines. Grouping neighboring hamainks into "education zones," could also enable elected local authorities to combine for other kinds of support to school improvement, such as the establishment of district teachers' resource centers.

Compensation and incentives

The costs of implementing rationalization include compensation to the "losers" in the process—primarily teachers who become redundant and families whose children's schooling is unsettled by changes in class groupings, teachers or move to a different school. They also include the incentives that are necessary to overcome natural opposition and mobilize sufficient general public support. Even for those who are not personally affected, the immediate costs of the restructuring will tend to be more conspicuous than the future benefits. Teachers—even the "winners" who remain in their posts with higher salaries—will experience stress during a period of uncertainty. It would be unrealistic to expect effective implementation without clear benefits to most of those whose cooperation is needed.

- *Redundancy policy*. A fair level of compensation for laid-off teachers needs to be centrally confirmed (this might need to be somewhat above the existing statutory level of three months salary, but must still be affordable), and newly "autonomous" schools need to be informed of their own legal position, rights and obligations concerning redundancies. It is not clear if schools will be required to meet redundancy payments from their own-managed budgets or if the severance policy will be supported by a separate central budget allocation.

- *Pay increases*. Good pay increases for remaining teachers could be linked to increases in class size and/or teaching hours.

- *Priority for rehabilitation of buildings and equipment.* The most valuable general incentive would be to link funds for school rehabilitation, reconstruction, furniture and equipment, to the rationalization process. For example, when the district has an approved plan, the schools that comply with this plan would qualify for the funding. To be effective as an incentive, almost all the capital funding to schools would need to be targeted on this basis – privatization proceeds, ASIF projects, etc. as well as budgetary funding. Quite aside from the incentive and demonstration effect, reconstruction activity should be closely coordinated with rationalization planning to avoid the danger of investing heavily in buildings that would soon need to be closed or modified.

- *Priority for in-service training.* Schools conforming to approved local rationalization plans could also be given priority for in-service teacher training (and other support to schools related to preparation for and piloting of the new standards, curriculum and assessment system). This would be in addition to specific training and other support needed by small schools that are forming multi-grade classes.

Ingredients in local-level decision making

Clear national guidelines for all aspects of the local planning process need to be prepared and disseminated. There is a danger that putting deadline pressure on the marzes to submit rationalization plans will lead to hasty, sub-optimal or unimplementable decisions (as has been the case in the past), unless this is balanced by clear central specification of the criteria and processes to be followed. Getting the best decisions at the local level will depend on the quality of information and analysis on which they are based. At the same time, although it's unlikely that local consensus can be reached on a decision to close or restructure a school, transparency and participation in the decision making process can help at least to enlist sufficient support to make the decision implementable.

- *Central information.* Assessment of the options for restructuring at the local level depends on clarification and local dissemination of all relevant information on national policy for the sector (including e.g., curriculum reform plans, see first section of this chapter), as well as on national guidelines and criteria for school consolidation.

- *Local information and consultation.* In addition to systematic data on enrolments, staff, demographic trends, and inventory of school buildings and conditions, decisions need to take account of detailed local information on social, economic and transport conditions, through consultation with those directly concerned.

- *Analysis of restructuring options, costs and benefits.* In all cases, it needs to be demonstrated that the future benefits justify the short term costs of implementation. In many cases, especially in urban areas, a decision will need to be made between alternative restructuring options. It is strongly recommended that a detailed analysis of options, costs and benefits be carried out as soon as possible in two or three sample districts or "education zones" where rationalization planning is relatively advanced. This could give some indication of the practical scope for and costs of rationalization on the national level, as well as provide the basis for clearer guidelines to marzes in estimating costs and benefits.

Box 1: Costs of implementing district level rationalization would include:

Short-term direct costs of rationalization:

- Information/consultation/facilitation services etc.
- Local data gathering, architectural surveys, school inventories
- Redundancy compensation
- Teacher training and materials for multi-grade classes
- Modifications to buildings where necessary (e.g., where small extension needed, or school changes function as from 10-grade to high school)
- Transport of existing furniture and equipment between schools

Any on-going recurrent costs:

- e.g., transport of pupils to schools beyond walking distance (whether assumed to be paid by parents or the school), although the high relative costs of transport in Armenia at present mean that this would only rarely be an economic solution.

Additional, related costs, significant for financial budgeting purposes:

These costs would not be relevant to economic analysis of the proposed restructuring measure because they are costs that need to be met with or without the restructuring. However, they would need to be budgeted to coordinate with implementation of the rationalization.

- Repair of existing and purchase of new furniture and equipment
- Structural repair and basic renovation of buildings and heating systems

Source: Authors research.

Planning and implementation schedule

A judgement needs to be made between full-scale national implementation and a more cautious, incremental approach. The former was used successfully in introducing reform of textbook provision, after systematic local consultation with school principals and parents in design of the new system. The incremental approach, which is being used to introduce the school finance and governance reforms, has the advantage that procedures can be refined and improved on the basis of pilot experience and, if successful, that public support can be increased through a positive demonstration effect. Potential disadvantages are the risks of losing momentum and of allowing time for opposition to become organized. The approach favored by the Ministry of Education is to pilot detailed rationalization planning and the first phase of implementation in three or four districts, with selection determined by the readiness of the district concerned and/or the level of priority for rehabilitation of buildings.

- *Piloting and demonstration effect.* Considering capacity constraints and the complexity of factors involved, there is a good case for piloting the planning and implementation process in a few districts and extending it incrementally to other regions. The success of this strategy would depend on adequate budgetary and other commitments to the pilot, to ensure a positive demonstration effect (as does the transition to school-based management).

- *Local capacity and logistical constraints.* Local rationalization plans need to include a realistic implementation timetable. The plans that were previously prepared by some marzes for school consolidation assumed full implementation in one school year. It needs to be demonstrated that this would be logistically feasible. A longer term planning framework might be more appropriate.

- *Budgetary allocations.* The schedule for implementing rationalization of schools, within districts and throughout the country, also has to be matched by budgetary capacity to meet the short term costs of implementation.

Public information and consultation

A major national campaign of public information and consultation will be needed to overcome general public skepticism, explain the purpose and benefits of the reforms, and enlist the support of enough stakeholders to balance inevitable opposition to specific decisions and make implementation possible.

- *Public information and consultation activities* related to school rationalization (included in the Bank-funded project) need to be stepped up. This would include informing the general public and education professionals on the realistic options, facilitating debate, and engaging participation at the local level in discussion of potential costs, benefits and alternatives.

APPENDIX: METHODOLOGY, ASSUMPTIONS, AND PROJECTIONS

The purpose of the model developed for this study is to indicate the future costs of general education in Armenia to the year 2009, with and without changes in staffing ratios and the number of classes, and to relate these costs to fiscal projections. It is used here to address several specific questions:

- What would be the costs of maintaining existing levels of staffing and buildings with adequate funding of all inputs (i.e., with sufficient funding of teachers' pay, buildings maintenance, and other inputs, to allow for reasonable quality, equity, and sustainability of services)? How do these costs compare with the projected budget envelope for general education?

- The Ministry of Education's funding proposals (MoES) assume some restructuring to increase pupil/teacher ratios, together with increases in teachers' rates of pay and in funding of other inputs. What would be the costs of financing the system on the basis of these proposals over the next decade, in relation to fiscal projections? If this plan were implemented, could it be expected to meet minimum essential needs for quality, equity and sustainability of the system?

- The new Medium Term Expenditure Framework (MTEF) of the Ministry of Finance includes a substantial increase in the share of the budget allocated to general education and also assumes increases over the next three years in the pupil/teacher ratio and in teachers' rates of pay. If implemented as planned, would this meet the essential needs of the system? What would be the impact on projected costs if the increase in pupil/teacher ratio were not achieved, or if an eleventh year were added to the general education curriculum (as is now envisaged)?

- Taking the MTEF projections of the budget envelope for general education, how much increase would be needed in the pupil/teacher ratio and average class size to allow adequate rates of pay for teachers and adequate funding of other essential inputs?

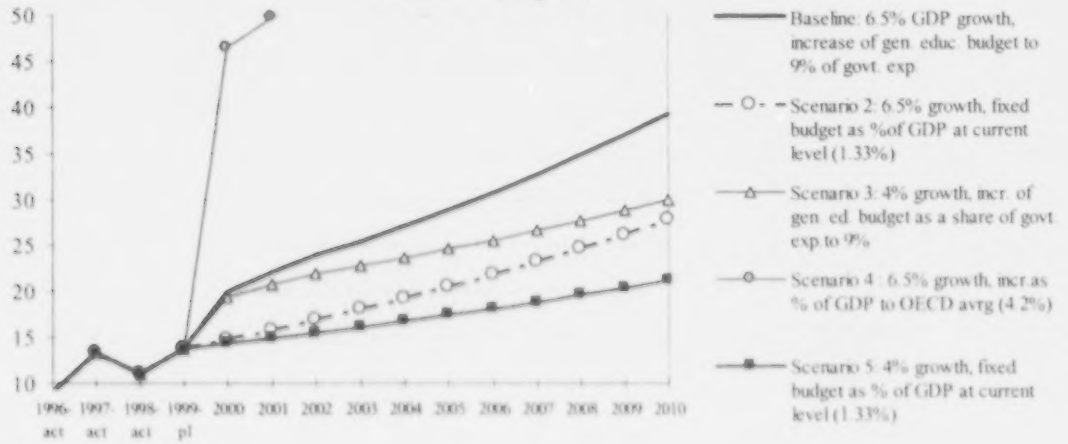
Macro and Demographic Assumptions

Economic growth. For the primary scenarios, the economy's growth rate is taken from the MTEF, which projects annual growth of 6.5% up to 2002. The same rate is assumed here to be constant until 2010. This growth rate is relatively optimistic in terms of recent performance and earlier projections. The potential impact is also tested, therefore, of a lower rate--4%--of growth in GDP.

Budget envelope for general education. This depends on the assumed rate of growth of the economy, the evolution of government expenditure, and the share of general education expenditures in total government spending. Figure 8 presents a series of possible macro developments. The baseline is taken from MTEF forecasts, assuming a growth rate of 6.5% and

an increase to 9% in the share of total government expenditures allocated to general education, equivalent to 2.5% of GDP. This would be quite a radical increase by recent standards, although still well below the average share of GDP allocated to general education in OECD countries (as the upper line in the graph indicates).

Figure 8: Budget for general education: macro scenarios, bilion dram at constant 1998 prices



Source: Authors computations

Figure 8 also demonstrates the high sensitivity of the MTEF education expenditure projections to changes in the assumptions concerning the rate of economic growth and the priority given to general education within the budget. If growth were to average only 4% instead of the projected 6.5%,.or the share of GDP spent on general education were to stay at its current level instead of being increased to 2.5%, the general education budget envelope would shrink to about 75% of the projected MTEF level by 2010. Failure on both scores would reduce the budget envelope to only half its projected level in 2010.

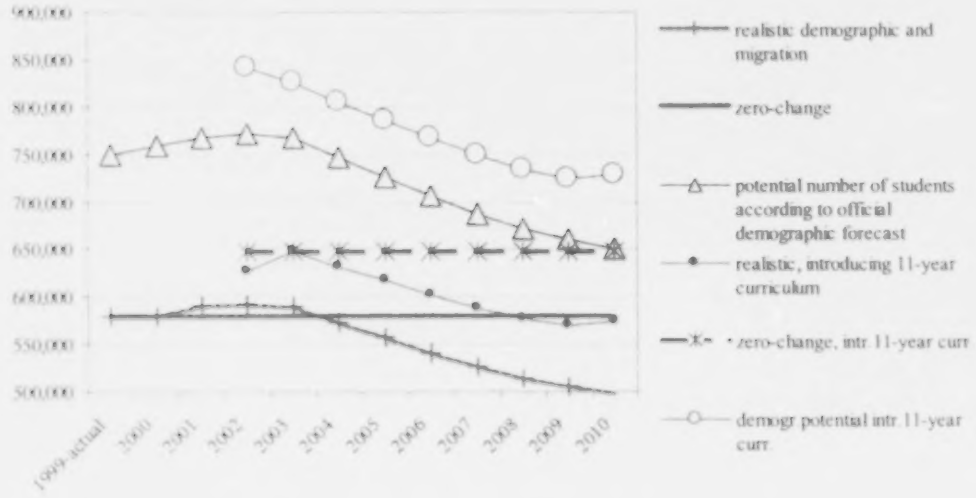
Inflation. The projected rate of inflation, (5% to 5.5%) is taken from the MTEF. No sensitivity tests were done, since this affects only the units of measurement, whereas key ratios of scenarios are in real terms. All the amounts, however, are presented in nominal values to set clear benchmarks for budget planning.

Growth in wages. The national average wage, which is currently reported at only 64.7% of per capita GDP, is assumed in the model to grow at a rate equivalent to the economy's growth rate plus inflation. The average wage of teachers is now only 36.7% of per capita GDP. The MTEF allows for substantial increases in the relative wages of teachers, raising these to 105% of the projected national average wage by 2003.

Demographic projections. In the primary scenarios, the total number of pupils in general education is assumed to remain constant at the existing level. Alternative projections are presented in Figure 9. There is a large discrepancy, not accounted for by observed enrolment

rates, between the number of children of school age in the country according to official demographic statistics and the actual number of pupils. This difference is due primarily to the scale of recent (unregistered) emigration, the precise impact of which will not be clear until the next census is taken (2000-2001). If these families were eventually to return to Armenia as employment opportunities improve, the number of pupils could revert to the earlier demographic potential, exceeding the current number of pupils by almost 25% in 2010. However, if these families choose to stay abroad, and considering also the very low fertility rates in Armenia during the 1990s, by 2010 the total number of pupils would decline by approximately 15%. As there is no basis at present for any confident prediction of the future net impact of migration, the number of pupils is assumed to remain constant in the basic scenarios. Another factor, however, which is likely to affect the number of children in school is the possible extension of the curriculum from a 10- to 11-year program. Continuation of the 10-year program is assumed in the basic scenarios, but the impact on the MTEF plan of adding an eleventh year is also examined (with the simplifying assumption that in future the actual percentage of grade 8 pupils going on to grade 9 remains constant and applies also to the grade 10 to 11 transition).

Figure 9: Demographic projections: children in school age



Source: Authors computations.

Input Variables

Three basic scenarios are examined: continuing the system as it is (baseline); restructuring according to Ministry of Education norms (MoES); and restructuring according to the Medium Term Expenditure Framework (MTEF). Estimates are also made of the level of wage rates and non-staff costs that would need to be met in Armenia to support quality and equity objectives and sustainability of the system – i.e., "adequate" funding of inputs. These estimates are based as far as possible on country-specific conditions and cost data. For some inputs, they are based on international norms for expenditure per pupil as a percentage of per capita GDP.

Staffing

The pupil-teacher ratio is the key structural ratio that has a direct impact on the required number of teachers and thus the wage fund. It also indirectly implies the average class size (depending on what changes are envisaged also in the ratio of teachers per class), and thus influences the number of classes in the system. The number of classes in the system determines, in turn, the demand for key material inputs, such as heating and buildings maintenance.

As illustrated in Figures 10-12, both the MoES and the MTEF scenarios envisage substantial increases in the pupil/teacher ratio, to 15 and 14 respectively, which would bring Armenia broadly in line with the levels typical in OECD countries. I.e., all scenarios assume that Armenia will maintain staffing ratios and class sizes at the levels afforded in the wealthiest countries, although countries at Armenia's current level of GDP per capita typically have pupil teacher ratios well in excess of 25. To illustrate the potential impact on total costs, therefore, we also examine the impact of increasing this ratio in Armenia to 20.

Figure 10: Restructuring scenarios: students/teacher ratio

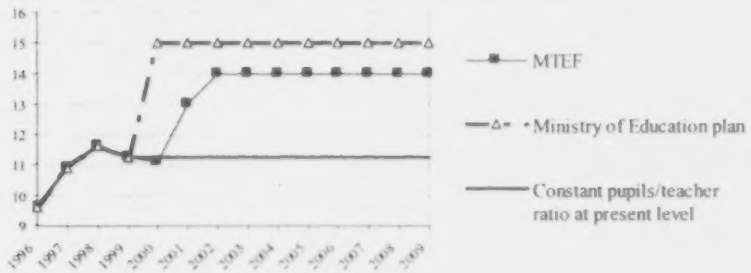


Figure 11: Restructuring scenarios: teachers/class ratio

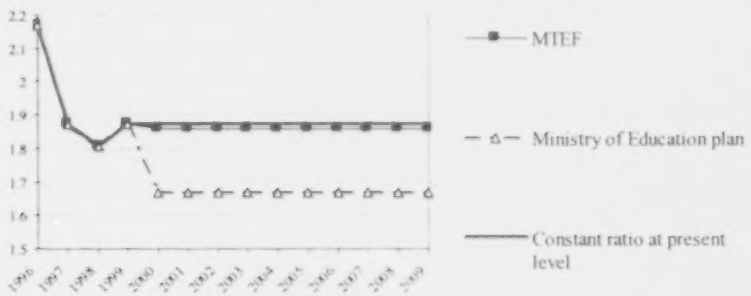
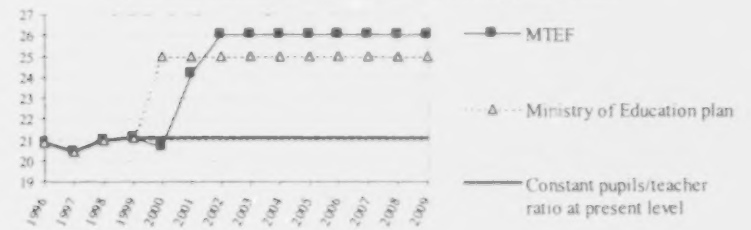


Figure 12: Restructuring scenarios: average class size



Source for Figures 10-12: Authors computations.

The outcome for each scenario in terms of the absolute reduction in number of teachers and classes is shown in Table 6. Although the MoES scenario envisages a slightly higher pupil/teacher ratio, it has a smaller impact in reducing the number of classes, because it also proposes a reduction in the ratio of teachers per class (to approximately the level found in OECD countries).

Table 6: Number of Teachers and Classes by 2007

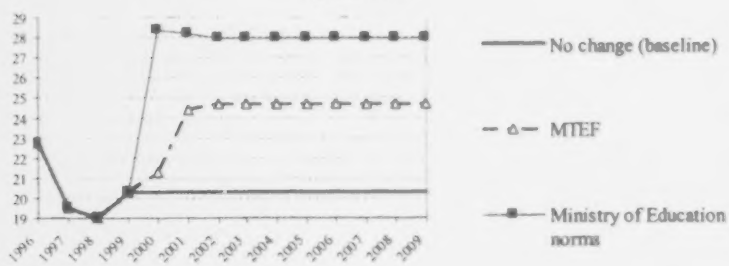
	Teachers	Classes
I. Baseline – Continuing with present	52,790	28,165
II. MTEF	42,143	22,686
III. Ministry of Education Plan	39,333	23,600
Applying OECD average class size and pupil /teacher ratio	*40,411*	*23,600*
With pupil/teacher ratio of 20	*29,500*	*22,686*

Source: Authors computations.

Non-teaching staff

Changes in the ratio of pupils to non-teaching staff in each scenario are illustrated in Figure 13. The current level of non-teaching staff in Armenia is even more excessive by international standards than the level of teaching staff. The reduction proposed by the MoES, therefore, should not be considered at all extreme (although in practice it would likely take more than one year to implement).

Figure 13: Restructuring scenarios: students/non teaching personnel



Source: Authors computations.

Wage rates

The current level of teachers' salaries, at only 33% of per capita GDP and 50% of the national average wage, is exceptionally low by any standards and below subsistence level. The MoES norms would increase this to reach the national average wage, or two thirds of per capita GDP. The MTEF proposes annual increases of 30% until 2002, which would have approximately the same impact. Whether this would be sufficient to maintain quality and effectiveness of the teaching force – to attract and retain qualified staff, achieve good morale, and eliminate the need for teachers to supplement income from other sources – is debatable. The national average wage may not be the best indicator because the formal labor market is still undeveloped and wages currently represent only a small share of incomes in Armenia. Ideally, the average teacher's salary needs to reach at least 100% of per capita GDP (teachers earn 1.5 to 2.5 times per capita GDP in OECD countries, and 2 to10 times in developing countries), to avoid the need for teachers to spend time on other income earning activities (including giving private lessons to their public school pupils). However, this is a problem affecting all public sector employees in Armenia. The increases proposed in the MTEF may be the most that is realistically achievable in these circumstances.

As Figures 14-15 demonstrate, the evolution of the average teachers' salary in real terms is similar under all restructuring scenarios until the year 2004. Beyond this point, neither the MoES nor MTEF plan envisages further rises in relative teachers' pay, and the increase in real terms reflects only overall income growth. The "adequate" funding scenario, however, assumes further increases in pay to reach 100% of GDP per capita by 2008.

Figure 14: Monthly average teacher salary in constant (1998) drams

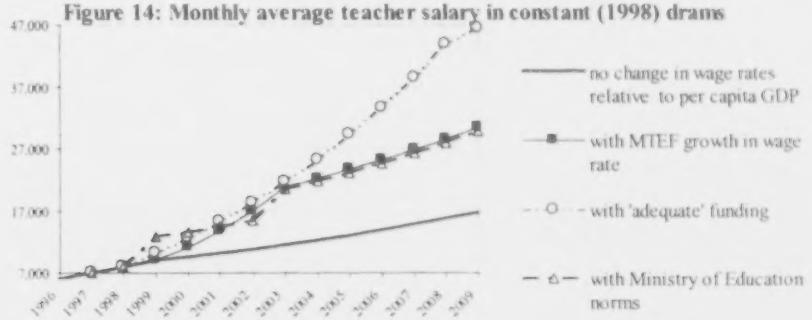
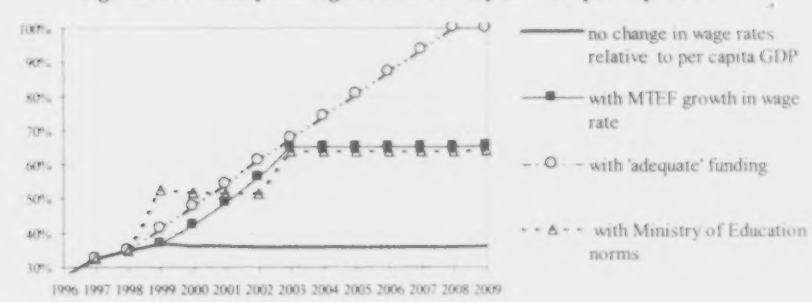

47,000
37,000
27,000
17,000
7,000
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
no change in wage rates relative to per capita GDP
with MTEF growth in wage rate
with 'adequate' funding
with Ministry of Education norms

Figure 15: Monthly average teacher salary to GDP per capita, %



Source for Figures 14-15: Authors computations.

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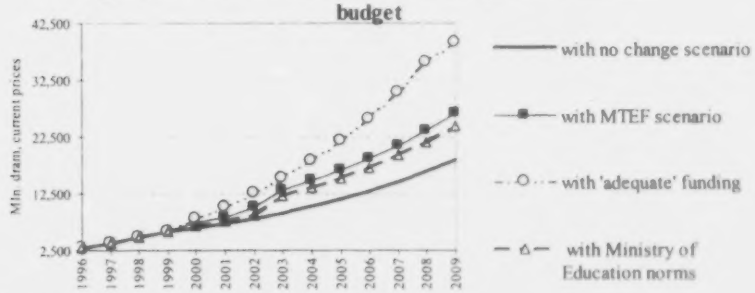
The impact of these changes in wage rates on the total teachers' wage bill (illustrated in Figure 16) is reduced in so far as each scenario also envisages reductions in the teaching force. The reforms proposed in MoES and MTEF imply a net increase of almost 45% in the teachers' public wage bill compared to the costs of continuing to run the system as it is, with no changes in staffing levels or relative wages. Bringing the system more in line with international norms for teachers' wages (based on the MTEF restructuring plan and continuing to increase salaries to 100% of GDP per capita) would require a doubling of spending on teachers' wages compared to the zero-change scenario.

Figure 16: Teachers salaries costs in the general education budget



Source: Authors computations

Buildings

Maintenance and capital repair. Recent levels of spending on maintenance and capital repair of schools have been grossly inadequate, with the result that many school buildings are now in need of major rehabilitation, structural repair or reconstruction. Broad estimates have been made of the actual requirements in Armenia – to arrive at an estimate in the model of the level of funding that would be required to restore buildings and halt the depletion of physical assets. For this purpose, it is assumed that the life of the buildings is 50 years and the cost of construction of a new school is US$600,000. We also take the estimate for 1997 that 40% of the school buildings in Armenia were in need of major rehabilitation, and assume, from the evidence of recent projects, that this costs on average US$15,000 per school. The accuracy of this estimate can be greatly improved when detailed information is available from architectural surveys of the current condition of all schools in the country. The gap between the estimated needs and what is actually spent on maintenance—which results in depletion of physical assets and greater need in the future—is treated here as spending "arrears" which simply build up over time. When actual expenditure is less than required by these assumptions, the "deficit" is accumulated in the arrears, adding linearly to the depreciation stock.

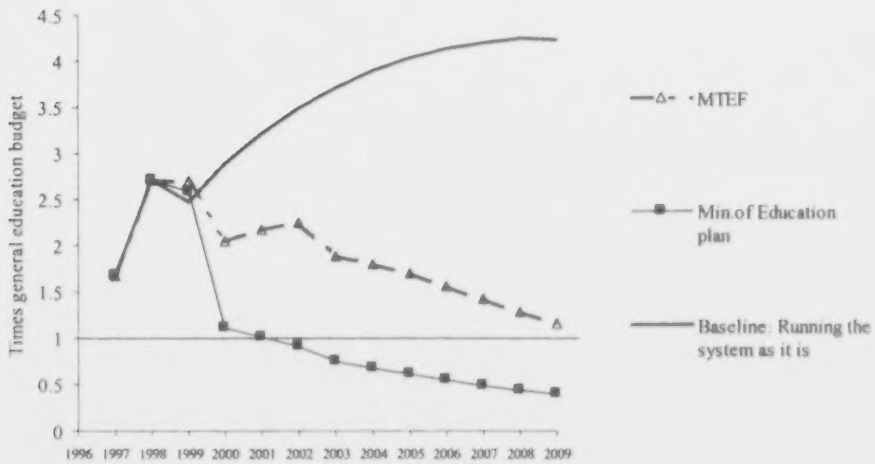
The current level of spending on capital maintenance, even when private and foreign expenditure is included, amounts to only about one third of the estimated need. In the MoES scenario, expenditure on buildings maintenance is based on pre-transition norms per pupil, updated using the inflation rate over the period. Comparison with our estimates of the full needs suggests that the MoES norms are in line with actual requirements (99%), and they represent a

huge increase on what is currently spent. The MTEF scenario also assumes a large increase in capital expenditures, but falling short of the Ministry of Education norms, meeting 80% of the estimated full requirements.

In the model, costs of maintaining and heating buildings are a function of the number of classes rather than the actual area of buildings space to be maintained. In so far as each scenario envisages reductions in the number of classes, therefore, maintenance and heating costs are also reduced. This is a proxy, in effect, for the actual amount of school buildings space which would be released in the process of consolidating classes and schools, and may somewhat overstate the realistic potential.

The estimated change in the level of capital arrears under each scenario is shown in Figure 17. In the current situation the total costs of bringing the physical assets to normal conditions are estimated at 2.7 times the total existing budget for general education. Continuing the existing spending patterns into the future would raise this ratio to 4.5 by 2010. The level of funding proposed under the MTEF would gradually reduce the arrears in capital expenditures and rehabilitation to a level that is comparable to the budget for general education, a clear improvement on the existing situation. The MoES funding norms would substantially solve the problem of capital depletion by the year 2010.

Figure 17: Capital renovation needs and accumulated arrears on maintainance to total general education budget under main scenarios



Source: Authors computations.

Heating. Until now, heating costs have been almost totally neglected in the education budget, covering only 3% to 5% of estimated costs of fully adequate heating of all schools. Part of this gap has been covered by foreign assistance, through the USAID-funded program for kerosene distribution, by private contributions, and by arrears to the power company. These sources together, however, were sufficient only to heat classes during the winter season to an estimated average temperature of 12 degrees Celsius. Now that the USAID program has been

C1

terminated, utility prices are being brought to cost recovery levels, and collection is being enforced, the costs of school heating have to be incorporated in the education budget.

Proposed budgetary expenditure on heating under the MoES scenario is based on norms taken from the previous system and updated using the current price structure. According to our estimates, these norms would cover 93% of the full need. The MTEF assumes a substantial increase in heating costs but would meet not much more than one third of the estimated full need by 2007.

Box 2: The model of heating costs

This block in the model is based on information provided in a 1998 survey and report for USAID on the Armenia School Boiler Project. To measure the temperature in classes and the required amount of spending, we balance the heat generated by different types of heating technology and the heat loss. To estimate the heat loss we use a formula which relates the difference in design temperature in classes with the outside temperature, °C, conductivity levels Ua, and the total area of school buildings. It was estimated (see Appendix B, USAID) that the total heat loss of the typical school building is 161,871 W/h. Assuming a typical heating period of 70 days and the prevailing heating regime, we get a total estimate of heat loss of 557.1 GCal per school per winter. The heat loss is also a function of the condition of school buildings. Thus, heat loss is estimated for the existing levels of maintenance of school buildings. We assume that not doing the maintenance and repairs increases the heat loss proportionally.

Applying standard efficiencies for different types of heating technologies and the actual mix of heating that exists now in Armenia (1/3 of classes use electrical tens, 1/3 solid of liquid fuel with or without a combination with tens, and 1/3 use gas boilers or district heating), we get an estimate that fits today's average temperature in classes during the winter at the actual cost of 22,800 drams per year per class. We also find that to heat the schools to the design temperature (21°C), with the existing prices and mix of heating technology, one has to spend on average 138,300 drams per class.

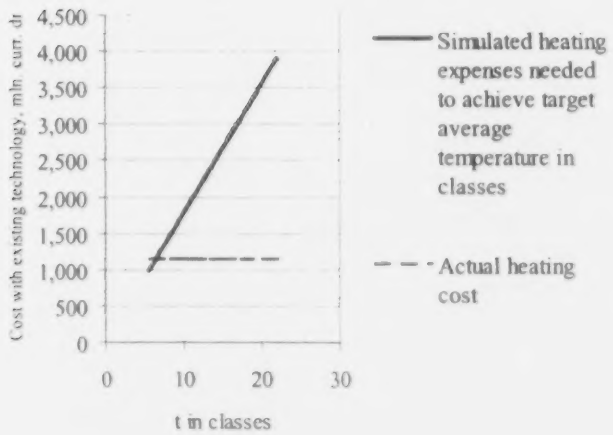
The model assumes that the system is gradually updated to the most efficient type of heating (gas boilers, estimated cost of properly heating a classroom is 59,300 drams per season) and that the fixed proportion of investment and maintenance expenditure (1/5) is spent on upgrading the heating devices (at an average cost of US$30,000 per school).

On this basis, a realistic estimate of the annual cost of heating the system is about 3.8 bn drams in current prices with existing heating technology.

Source: Advanced Engineering Associates International. Armenia School Boiler Project, USAID 1997 and Authors calculations.

From the model of heating costs, it is possible to deduce what average temperature would be achieved in schools, with a given outside temperature, at different levels of expenditure on heating. Figure 18 presents an example. At the current level of spending, the predicted temperature would average about 7C (far below the conceivable minimum for the classroom) when the outside temperature is –19 C. Schools would be forced to close in cold weather.

Figure 18: Heating cost and temperature in classes in winter (outside t is -19 C)



Source: Authors computations.

Other utilities. For electricity consumption, we assume in the adequate spending scenario that the Ministry of Education norms are reasonable (.15 kW per student per day). Current expenditure on electricity would meet only one third of this norm. Costs of water, sanitation and other utilities are taken from the MTEF and projected in the future with the inflation rate.

Other Inputs

This category covers a wide range of goods and services, from textbooks and other learning and teaching materials, library resources, equipment, and laboratory supplies, to communications, transport, in-service training, etc. The required expenditure is small in relation to the total education budget but the impact on teacher effectiveness is great. Under recent fiscal pressure in Armenia, these have been treated as a residual item, so little has been budgeted and even less spent. Current expenditure is less than 0.1% of per capita GDP per student. The MoES norms would raise this to 0.8%. The MTEF treats these expenditures as a residual item, and envisages spending only 0.3% of per capita GDP per student for such inputs. The average annual per pupil expenditure in OECD countries is about 2.9% of GDP per capita, which is assumed here to be the appropriate level for fully adequate funding.

The potential costs associated with rationalization itself are not included in the model. These costs would be of two kinds: (i) short term costs of restructuring, including staff redundancy payments, modification of buildings, transport of furniture and equipment, etc., and (ii) any additional recurrent costs resulting from the restructuring, such as transport of children who are no longer within walking distance of a school as a result of school consolidation. In practice, existing transport costs and constraints make it unlikely that bussing children to school would be a viable option in many cases, so these costs would probably not occur often. The model does not account for any of these costs.

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Costs in Relation to Fiscal Projections

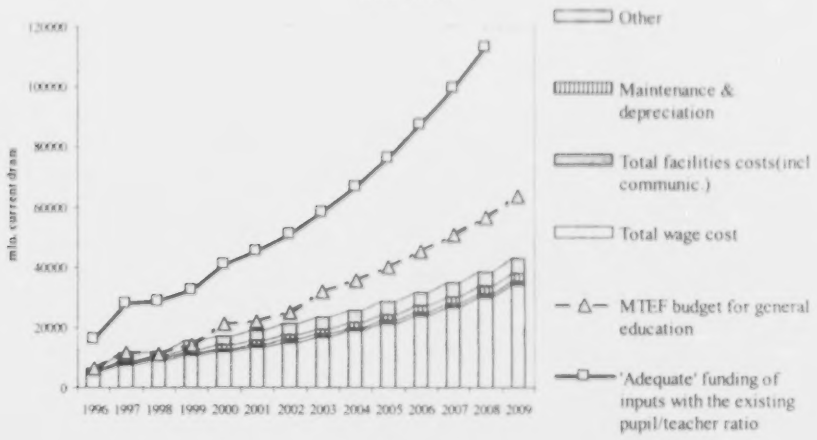
Continuing the system as it is now

The baseline case takes actual per pupil ratios in 1998 as given and extends the costs into the future with a constant growth rate. All physical inputs are assumed to stay constant at the existing levels (number of pupils per teacher, number of classes per school, number of non-teaching staff, electricity consumption, all non-wage expenditures). The key ratio in the model — the wage rate of teachers to the average economy's wage rate — is projected to remain at the existing level of 53%. Since the real average wage in the economy is projected to grow at 6% per year, the same rate of growth is assumed for teachers' wages. Non-wage inputs are assumed to grow at the inflation rate, so all non-wage expenditures are assumed constant in real terms. The model assumes that everything that is budgeted is actually spent.

This scenario would require for general education only an estimated 5.5% of the total consolidated government budget by the year 2007, clearly a manageable target, up from 4.3% in 1998. However, this would be at the cost of drastic depletion of fixed assets as well as deterioration in the quality of education. Existing capital renovation needs of the country's schools are estimated to be equivalent to about twice the current annual budget for general education. If the current pattern of funding to the sector were continued, accumulated arrears on maintenance would amount to renovation costs as much as five times the projected budget by 2007.

The total theoretical "funding gap" in this case — the difference between total budgetary expenditure on general education and the estimated full annual costs of funding the system adequately with baseline staffing ratios — would amount to 2.8% of GDP in 2007.

Figure 19: Running the system as it is: public costs of general education

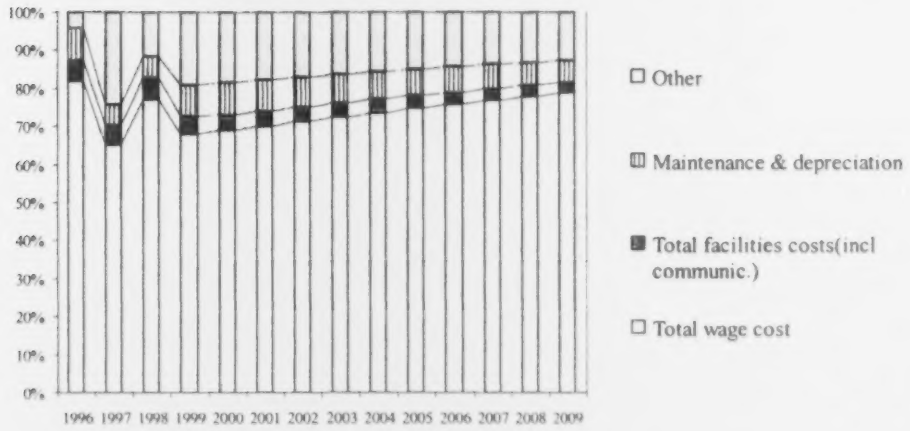


Source: Authors computations

Figures 19-20 show the evolution of the general education budget under the baseline scenario, both in absolute levels and from the point of view of structure. The solid line in Figure

19 indicates the scale of the gap between what is budgeted and what would be needed to fund all inputs adequately without any rationalization of staffing and classes. The structure of spending, shown in Figure 20, would remain essentially unaltered with wages absorbing a high and slowly increasing share of the funds.

Figure 20: Running the system as it is: composition of general education budgetary costs



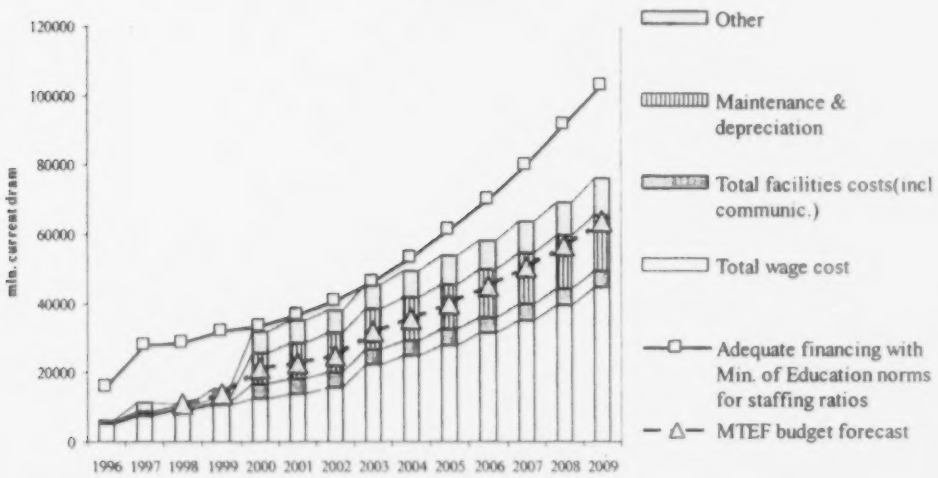
Source: Authors computations.

Implementing Ministry of Education norms

Under this scenario we use the Ministry of Education's plan. This plan assumes quite rapid movement towards more efficient staffing norms, and specifies country-specific norms for maintenance, utilities and physical inputs. The MoES norms for heating, power and maintenance prove to be quite close to our estimates of what is needed for fully adequate funding of the system.

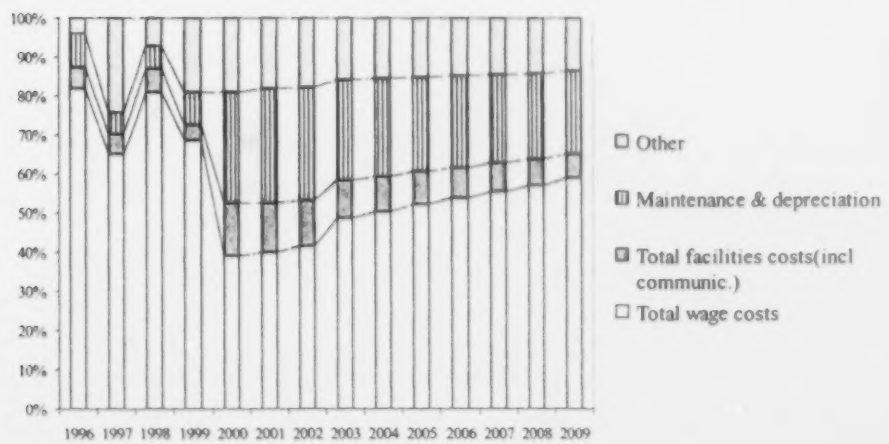
As Figure 21 shows, this scenario substantially exceeds the projected budget envelope for education. Nevertheless, there is still a small "funding gap" (0.75% of GDP in 2007) between the proposed level of spending under the MoES plan and the estimated full needs, due primarily to the somewhat smaller increases in relative pay for teachers assumed in the MoES plan. The structure of expenditure (Figure 22) would change radically with wages accounting for a much smaller share of the total despite the increase in wage rates.

Figure 21: Ministry of Education norms: public costs of general education



Source: Authors computations.

Figure 21: Ministry of Education norms: public costs of general education (breakdown)



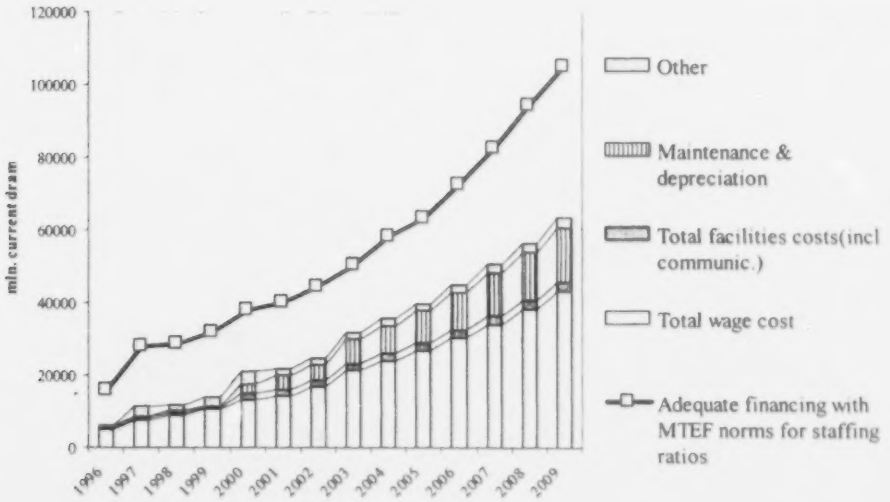
Source: Authors computations.

Implementing MTEF norms

Under this scenario, the total planned expenditure is tailored to budget projections. The MTEF scenario gives a slightly more conservative plan than the MoES for key structural changes, but represents a major advance in the level and structure of funding in comparison with

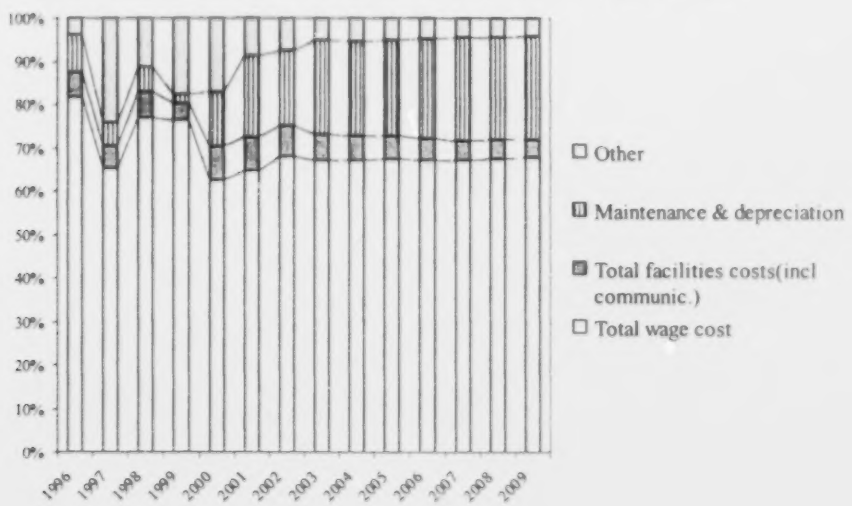
the baseline. As a result, although the "funding gap" is still significant (Figure 23), it is greatly reduced in comparison with the baseline scenario. Key inputs that remain under-funded are: teachers' salaries (still below the GDP per capita benchmark), heating costs, buildings maintenance, equipment and teaching materials.

Figure 23: MTEF: public costs of general education



Source: Authors computations

Figure 24: MTEF: public costs of general education (breakdown)

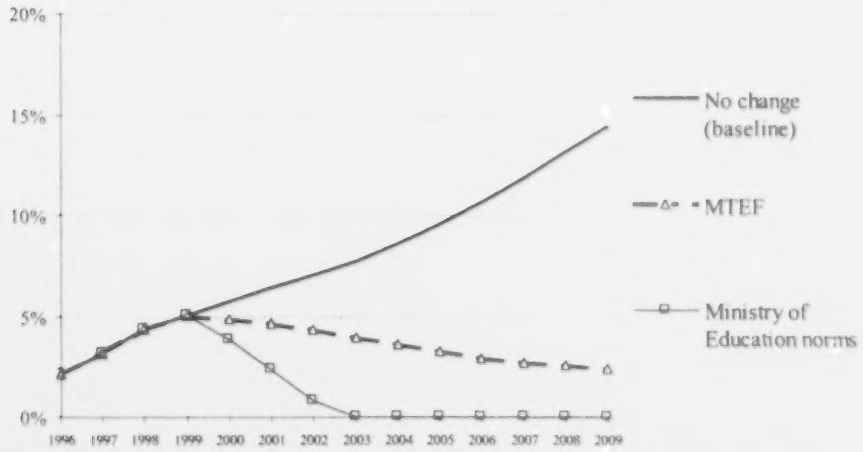


Source: Authors computations

The total financing gap

How much of the projected funding gap could be met from private expenditure and humanitarian assistance? The scale of the shortfall in total (including non-budgetary) funding under each scenario is depicted in Figure 25. It is assumed here that private financing to general education continues at its present level, estimated (primarily from household surveys) at 1.5% of GDP. (This tends to overstate the impact of household expenditure on the "funding gap" as defined here, because it includes expenditure on indirect costs of clothing, meals, transport, etc. which are not included in the model.) With MoES funding norms, the financing gap would be eliminated. Under the baseline, no-change scenario, the cumulative shortfall would reach 14% of annual GDP by 2009, while the MTEF plan would reduce this to just over 2%. This suggests that, with measures to improve the efficiency of private spending, and some additional effort in rationalizing the use of staff and buildings, the MTEF plan would not be too far off.

Figure 25: Cumulative financing gap (% of GDP): difference between total needs and spending from all sources since 1996



Source: Authors computations.

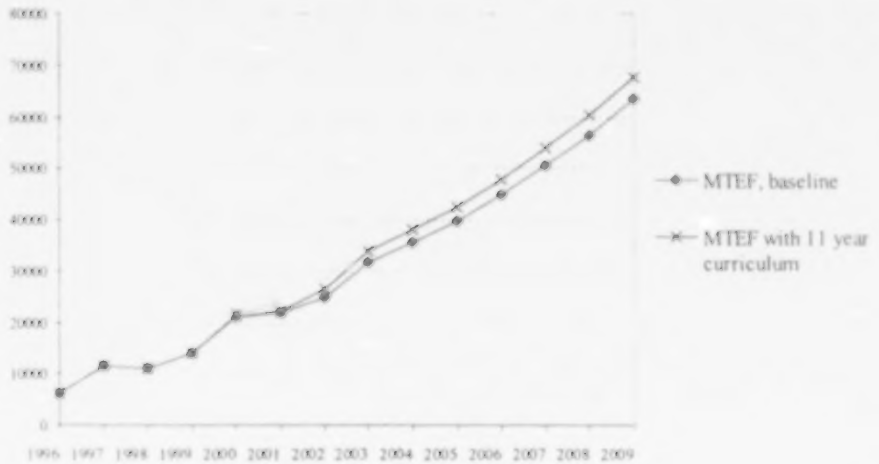
Sensitivity Analysis for MTEF Scenario

Assumptions on curriculum hours

The Ministry of Education is now considering extending its general education curriculum from 10 to 11 years, beginning in 2002. Armenian children begin school one year older and finish one year younger than the international norm. This compression of the curriculum puts excessive pressure on teachers and pupils to cover the required knowledge content in the time available, especially as new subjects are being added to the curriculum, inhibiting the adoption of more active learning methods and a more qualitative approach to assessment and evaluation.

Under all the scenarios presented above, a continuation of the existing school calendar and years of schooling is assumed. What impact would the introduction of an additional year in high school have on general education costs under the MTEF plan? If it is assumed, quite realistically, that the additional year could be accommodated within existing school buildings space, the model indicates that adding the eleventh year would increase annual costs by about 8% by 2007.

Figure 26: Cost of general education under the existing curriculum and 11-year curriculum (MTEF framework)

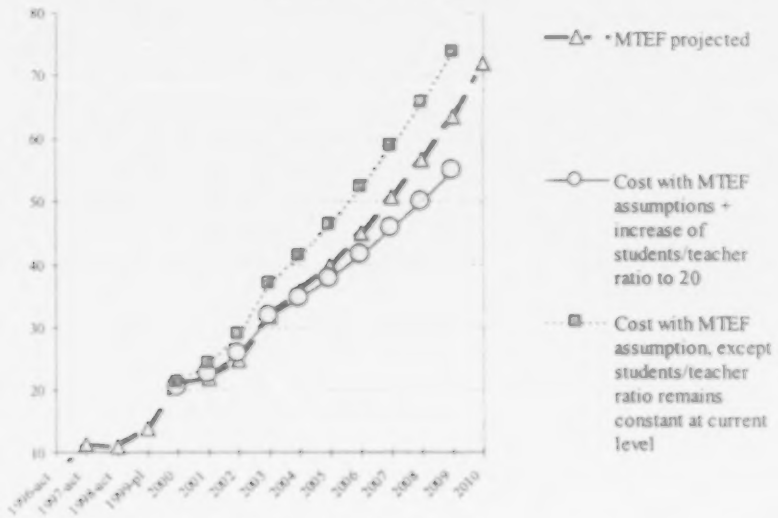


Source: Authors computations

Assumptions on increases in pupil-teacher ratio and class size

The MTEF assumes that the pupil/teacher ratio can be increased from its current level of about 10 to 13 in 2001 and 14 in 2002. What would be the impact on costs if (a) this were not achieved and there were no change in the pupil/teacher ratio or (b) a major program of rationalization succeeded in raising this ratio gradually to 20? The results are depicted in Figure 27. With no change in the pupil/teacher ratio, by 2009 total costs would exceed the projected budget by more than 12 bn drams, or 16 %, because the wage bill would be 23% higher than predicted. On the other hand, if this ratio were progressively increased to 20, by 2009 wage costs would be 20% (or 8.5 bn drams) lower than the MTEF prediction, increasing the funds available for other key inputs, and reducing the theoretical funding gap to 0.46% of GDP.

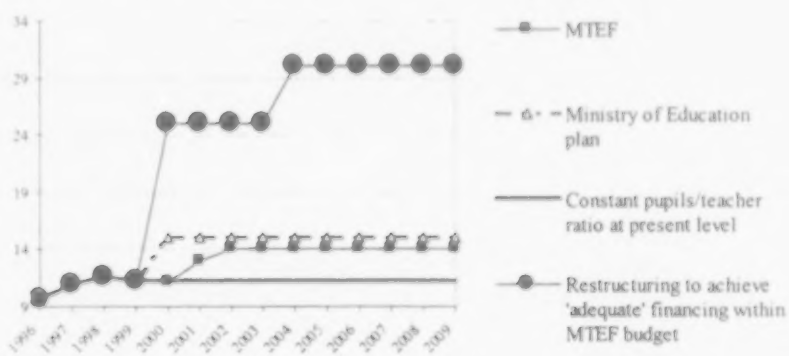
Figure 27: Impact on MTEF budget of changing assumptions on students/teacher ratio


MTEF projected
Cost with MTEF assumptions + increase of students/teacher ratio to 20
Cost with MTEF assumption, except students/teacher ratio remains constant at current level

Source: Authors computations

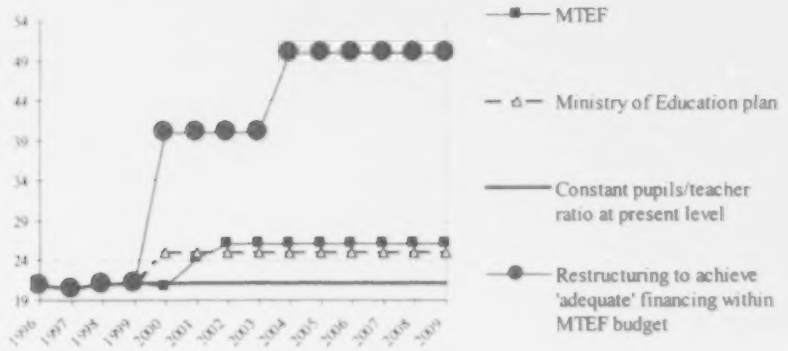
How much higher would the pupil/teacher ratio have to be for the projected budget to fund all essential non-wage inputs adequately and still raise teachers' pay to adequate relative levels? On the basis of the model, the funding gap could be eliminated completely—i.e., all key inputs to general education could be funded adequately within the projected budget—if the pupil/teacher ratio were increased to 29 and the average class size to 49 (Figures 28 and 29). Such a radical restructuring is unlikely to be feasible or desirable. Nevertheless, it *is* likely that Armenia could achieve better education outcomes within its resources by increasing the pupil/teacher ratio beyond the level envisaged in the MTEF—giving teachers larger classes but paying them more and supporting them with the necessary equipment, materials, facilities and services.

Figure 28: Restructuring scenarios: students/teachers ratio


MTEF
Ministry of Education plan
Constant pupils/teacher ratio at present level
Restructuring to achieve 'adequate' financing within MTEF budget

Source: Authors computations

Figure 29: Restructuring scenarios: average class size



Source: Authors computations

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